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**RADIO TEST SET  
MAINTENANCE MANUAL  
2965, 2965A,  
2966A,  
2967 & 2968  
Volume Two**

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## Chapter 7

# SERVICING DIAGRAMS

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## Circuit notes

### Component values

Resistors :	R = ohms,	k = kilohms,	M = megohms.
Capacitor :	μ = microfarads,	n = nanofarads,	p = picofarads.
Inductors :	μ = microhenries,	m = millihenries.	
SIC :	value selected during test, nominal value shown. In some instances, no component may be fitted.		

### Symbols

Symbols are to IEC617 (BS 3939) with the following additions :



Static sensitive component

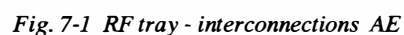


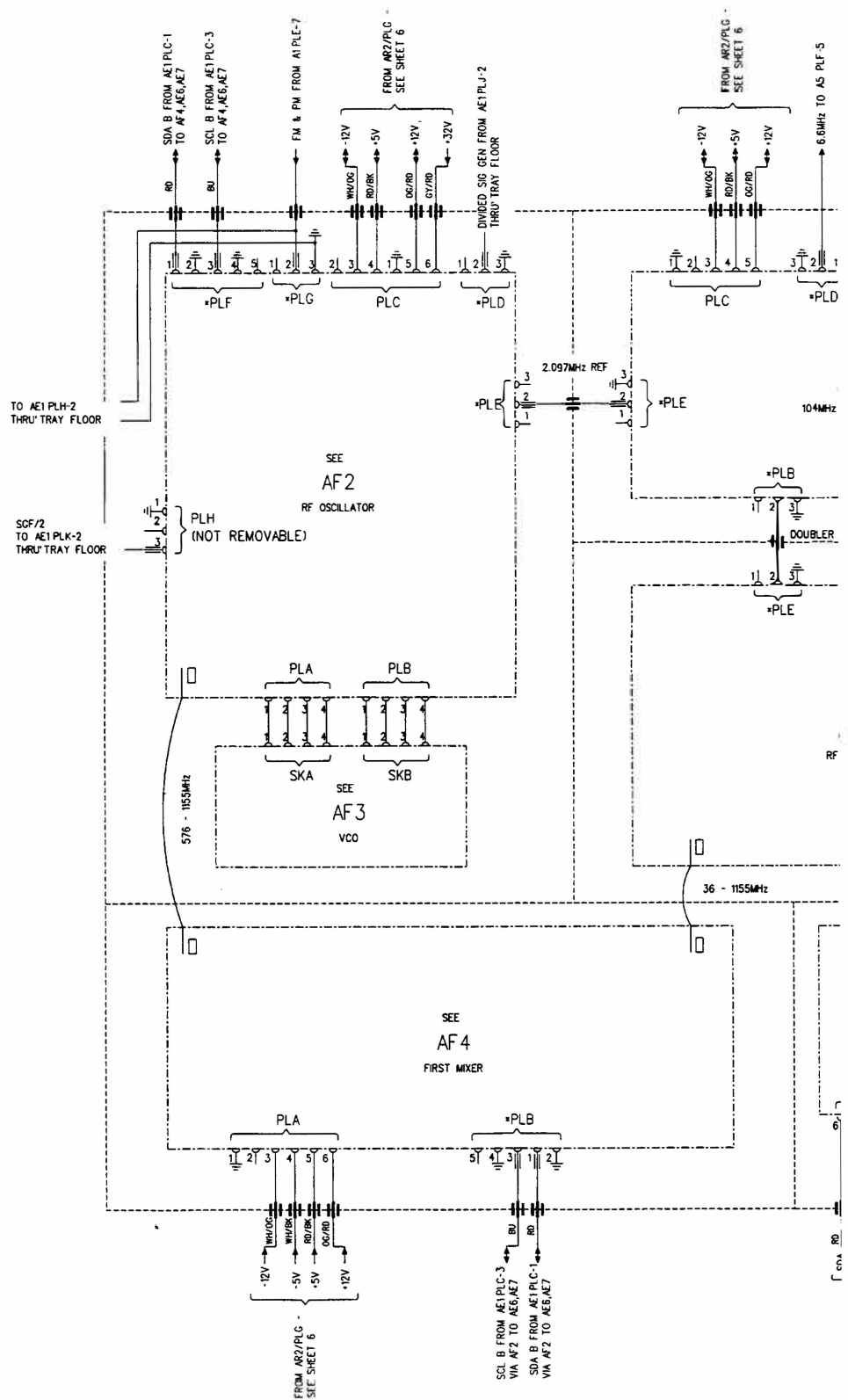
Test point



Unit identification







Interconnections **AF**

NOTES:

1. \*PL? = REVERSIBLE CONNECTORS

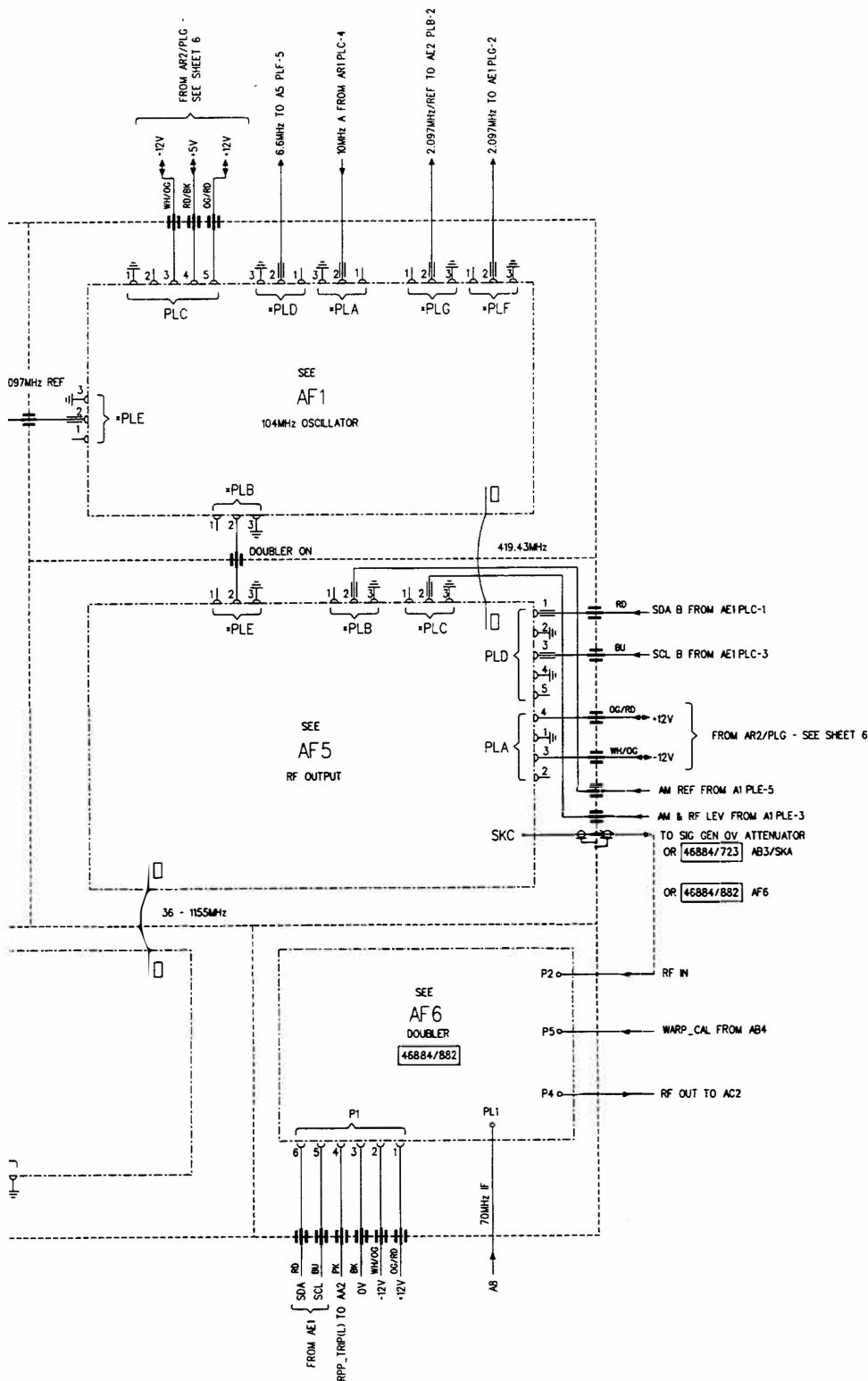
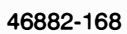


Fig. 7-2 RF tray - interconnections AF

2. PLM AND PLL FITTED ON A6/2 ONLY,  
PLK IS 34 WAY ON A6 AND 20 WAY ON A6/2.





# Interconnections A6, A7, AB2, AA1, AA2

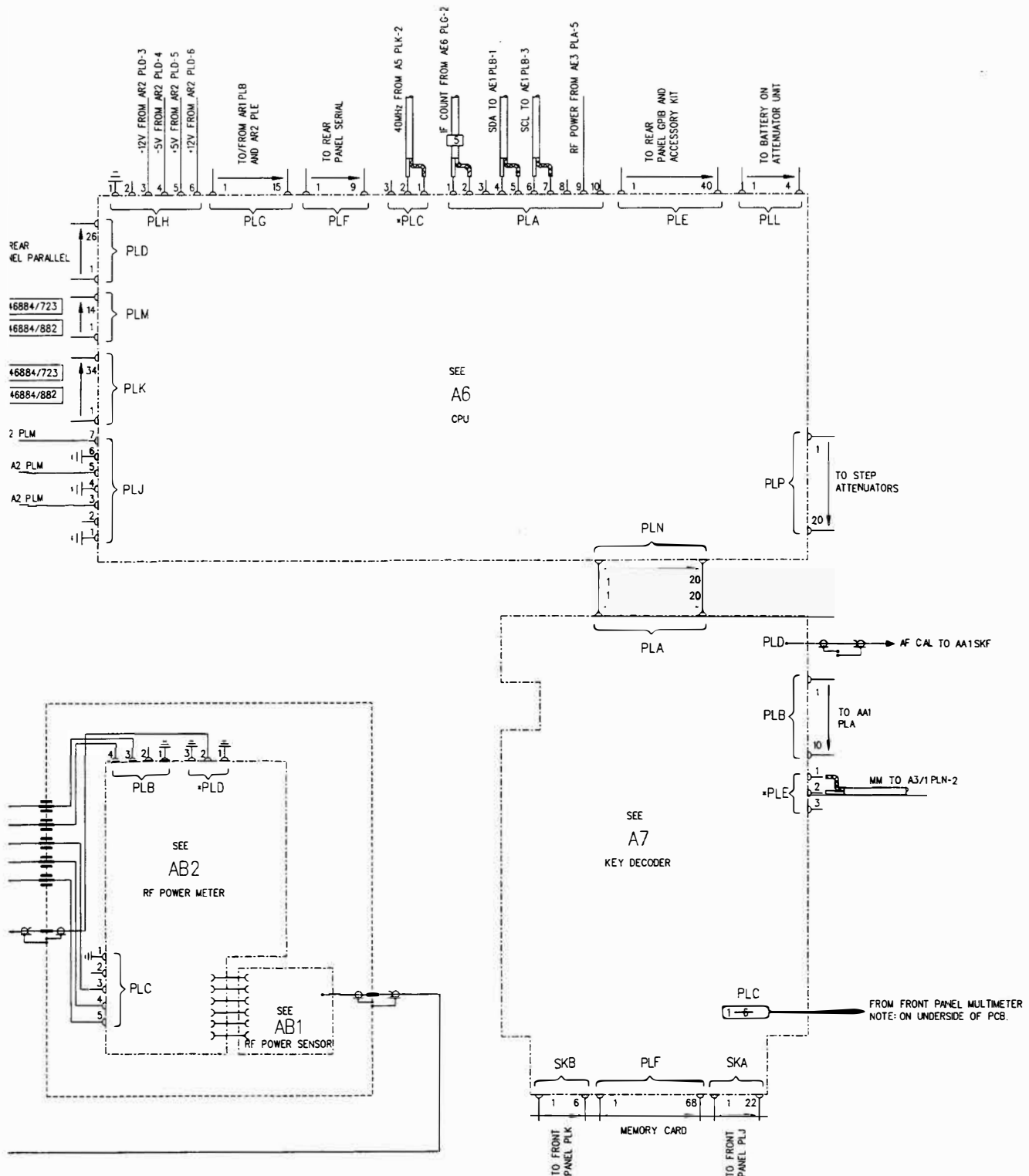
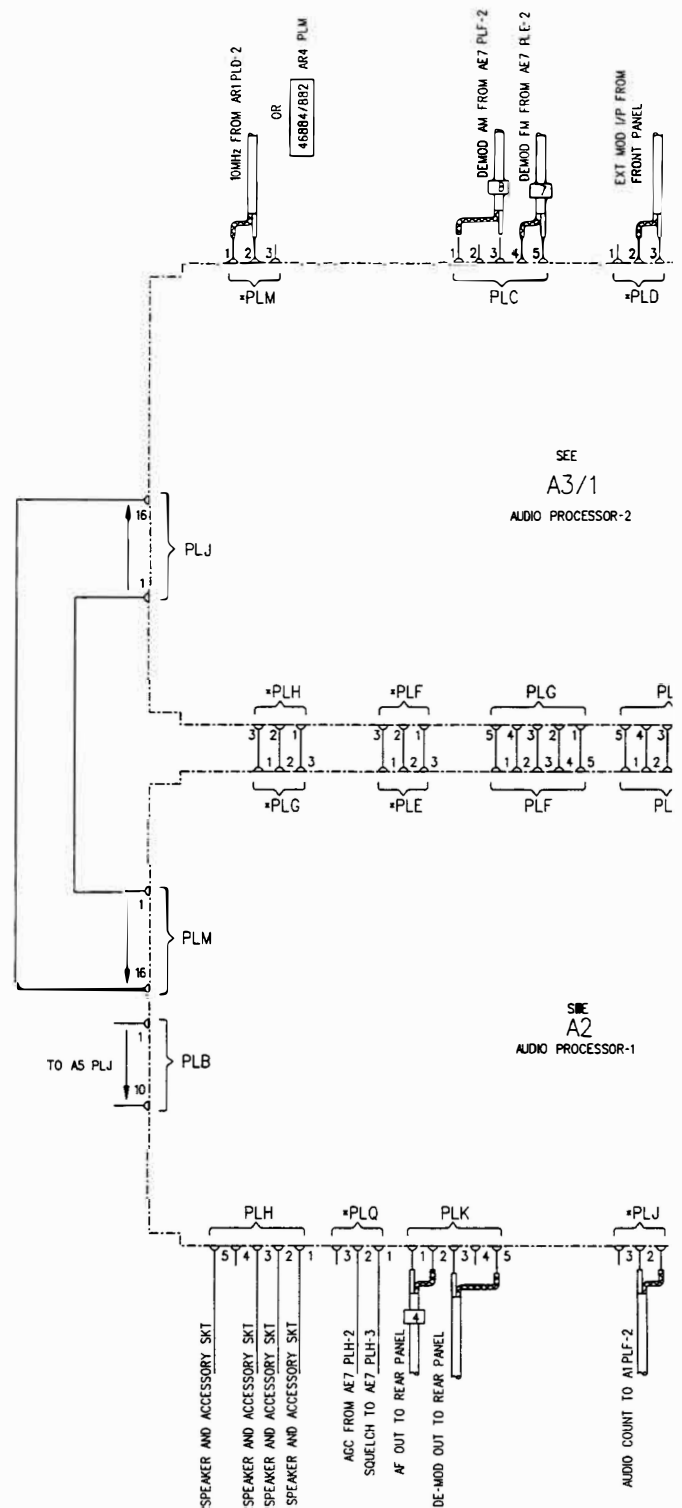
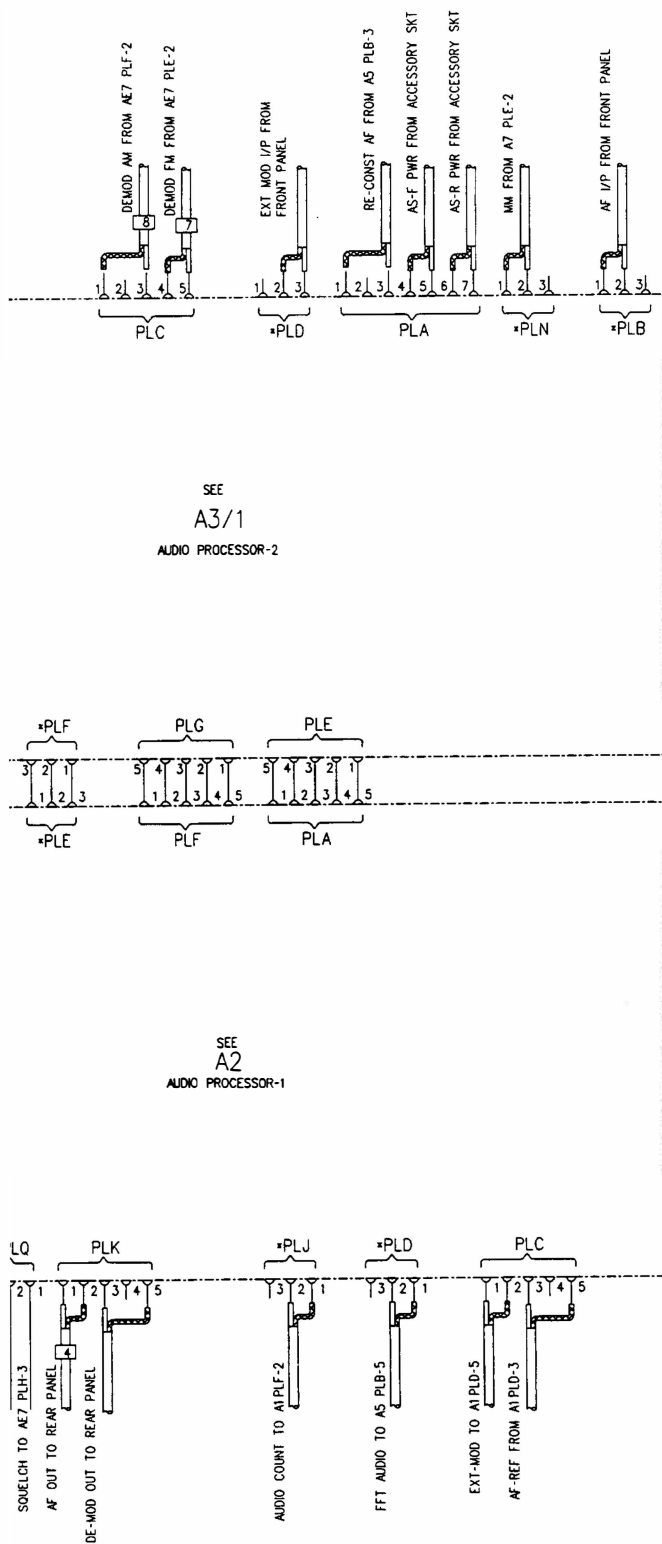


Fig. 7-3 Interconnections A6, A7, AB2, AA1, AA2

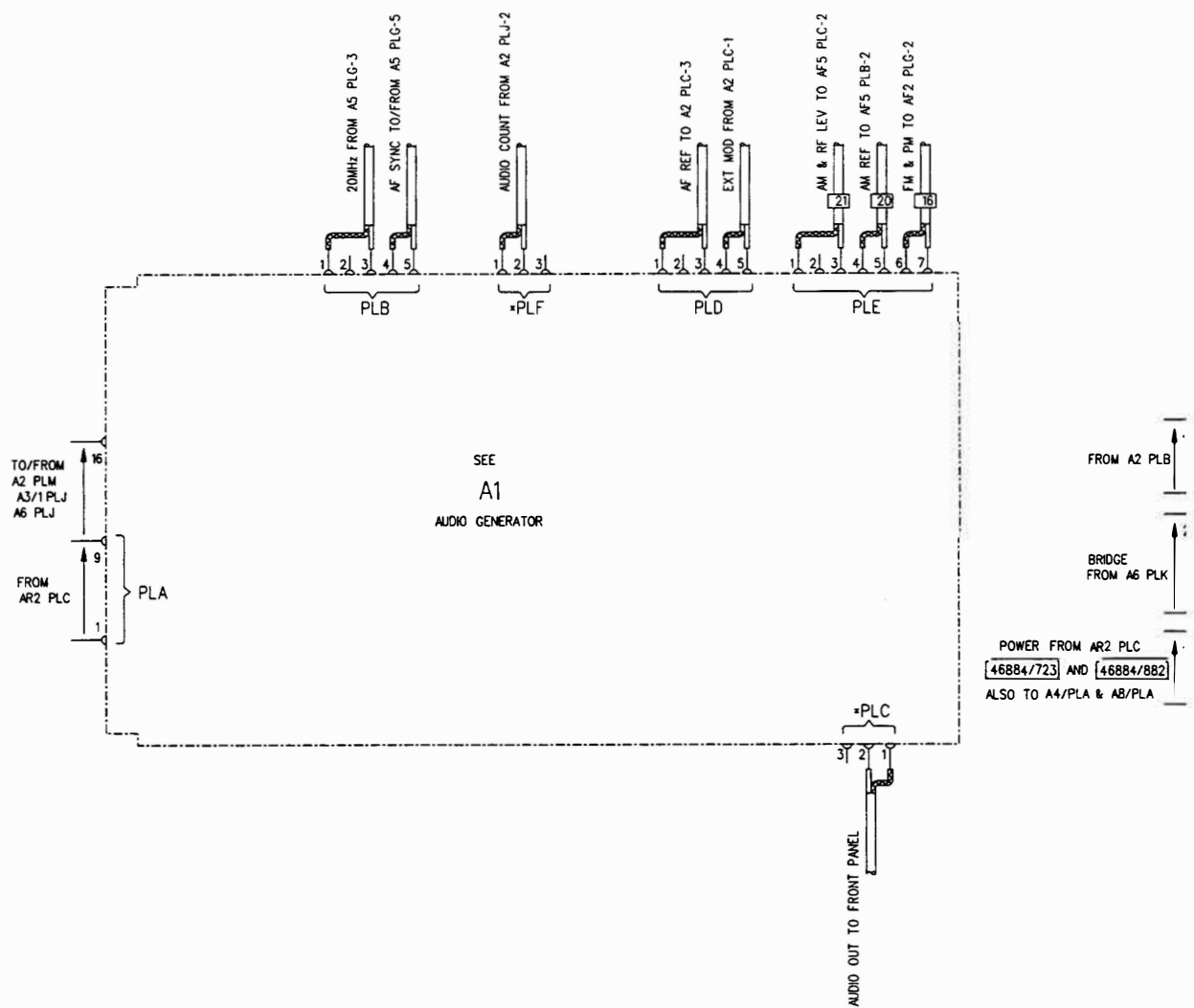


Interconnections **A2, A3/1**

NOTES:

1. \*PL? = REVERSIBLE CONNECTORS

Fig. 7-4 Interconnections A2, A3/1



## Interconnections A1, A5

NOTE:

1. \*PL? = REVERSIBLE CONNECTORS

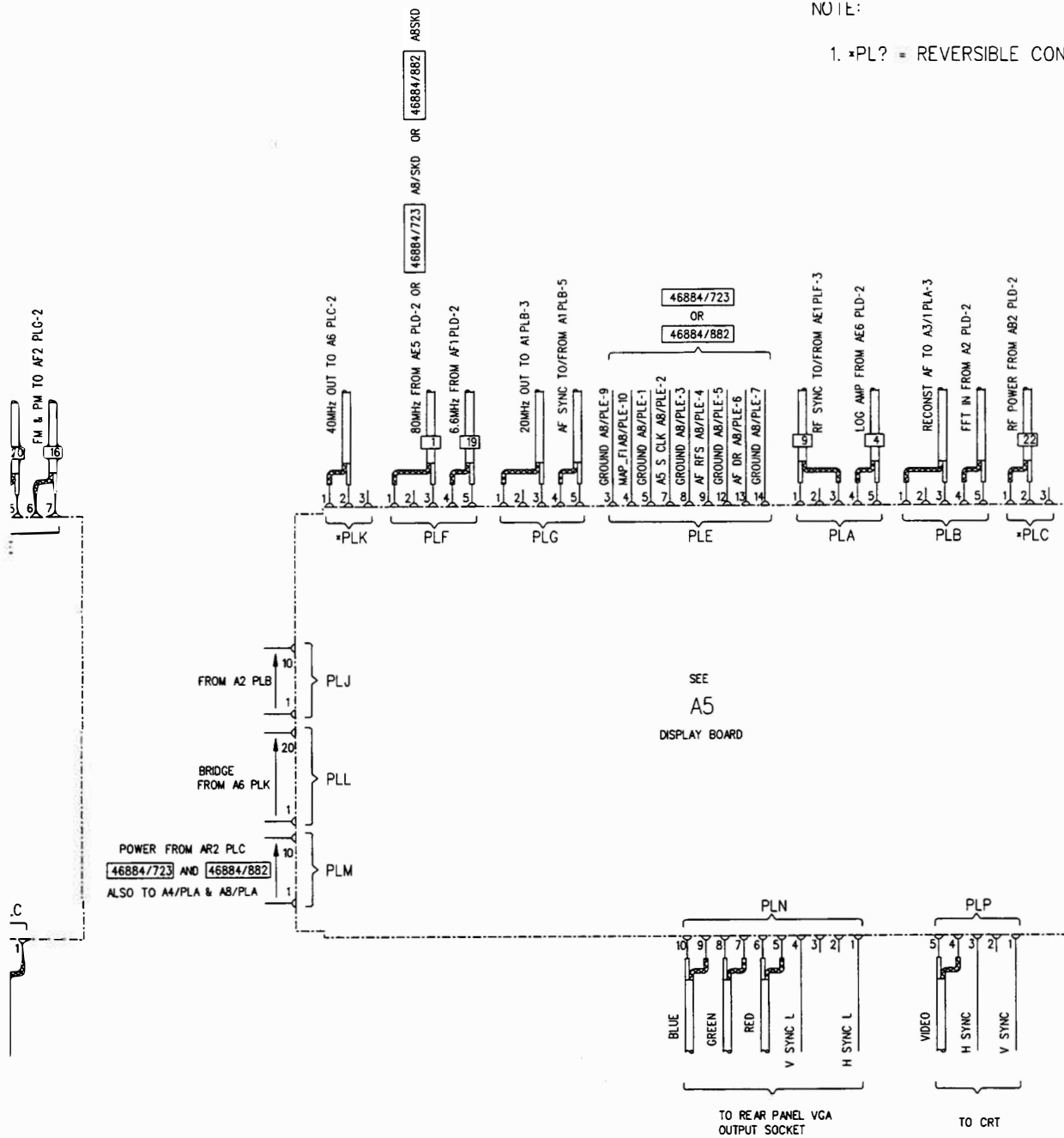


Fig. 7-5 Interconnections A1, A5



## Interconnections AR1, AR2

### NOTES:

- 1 \*PL? = REVERSIBLE CONNECTORS
- \*\* = ON EARLY INSTRUMENTS ATTENTION MUST BE PAID TO CORRECT ORIENTATION OF THIS CONNECTOR.
2. +12VB RETURN ISOLATED FROM SYSTEM CHASSIS & EARTH.

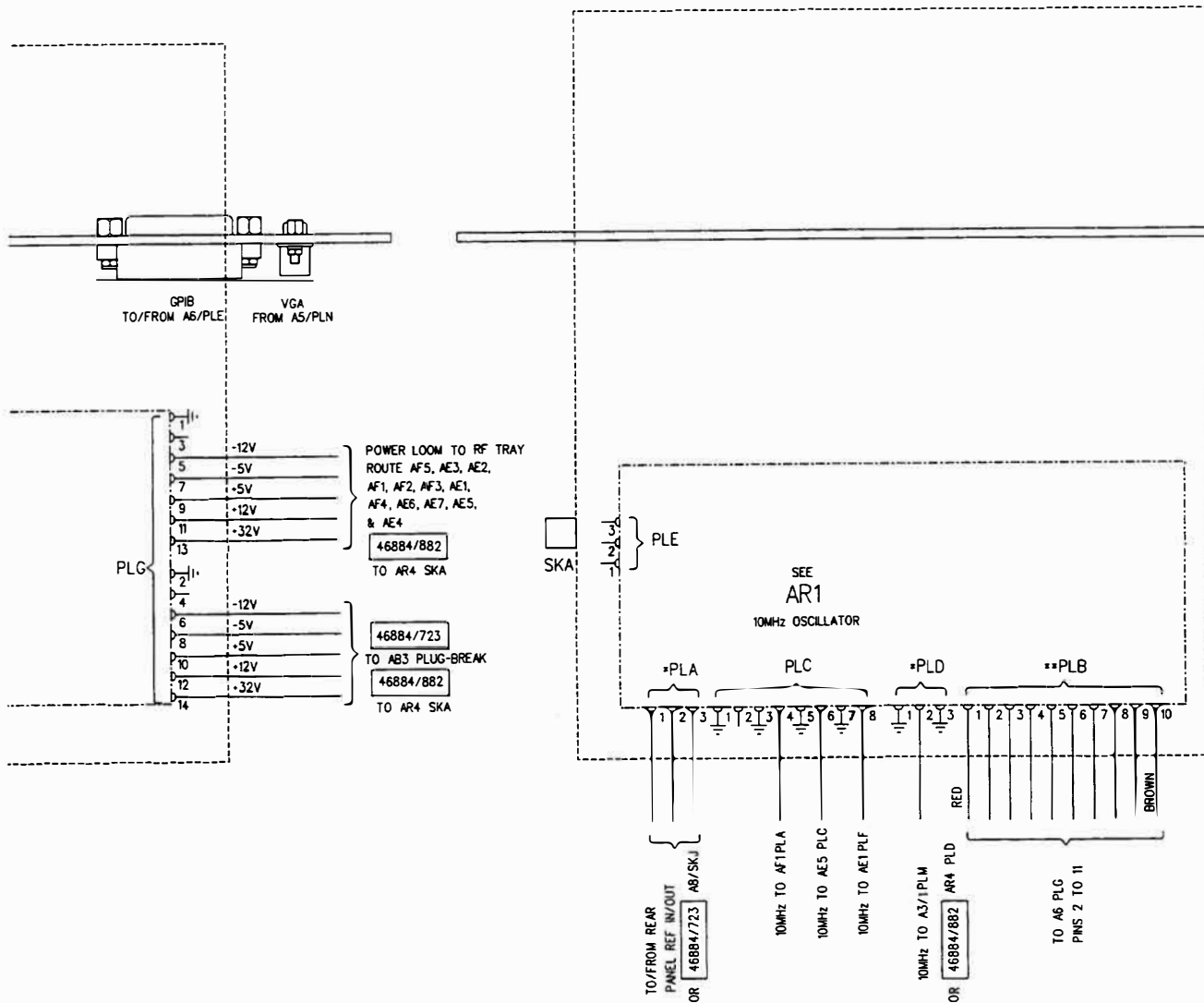
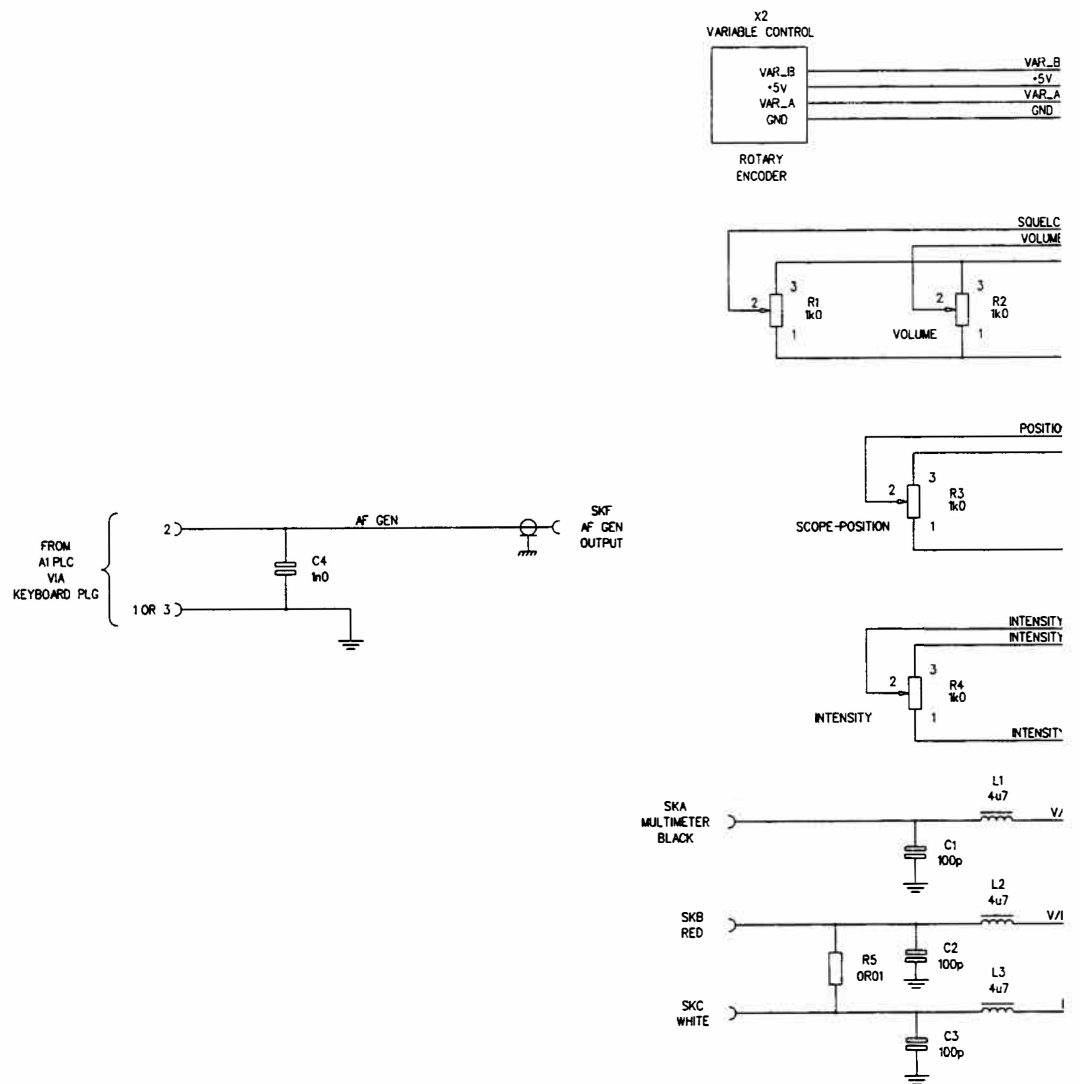


Fig. 7-6 Interconnections AR1, AR2





## Interconnections - front panel

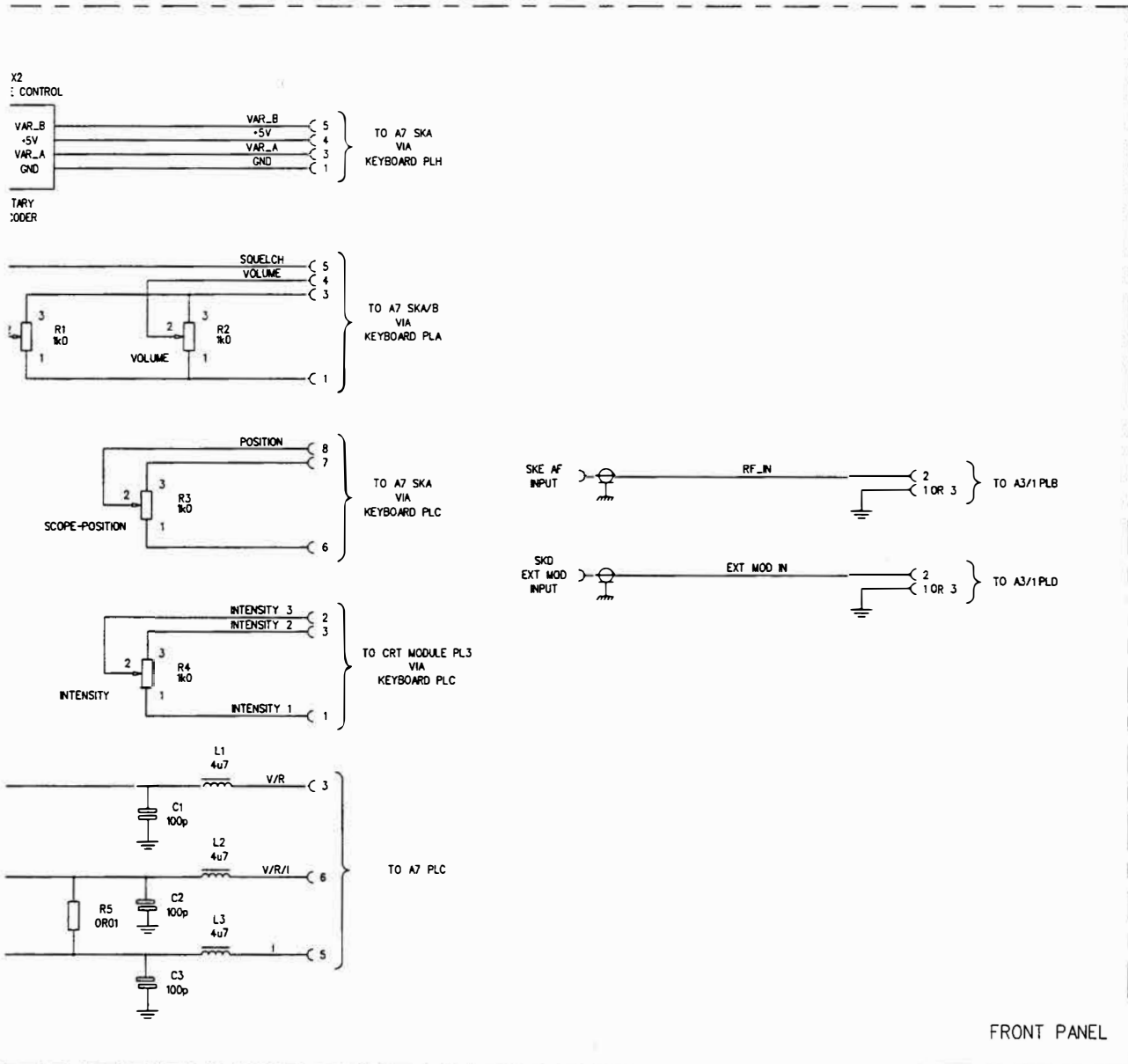
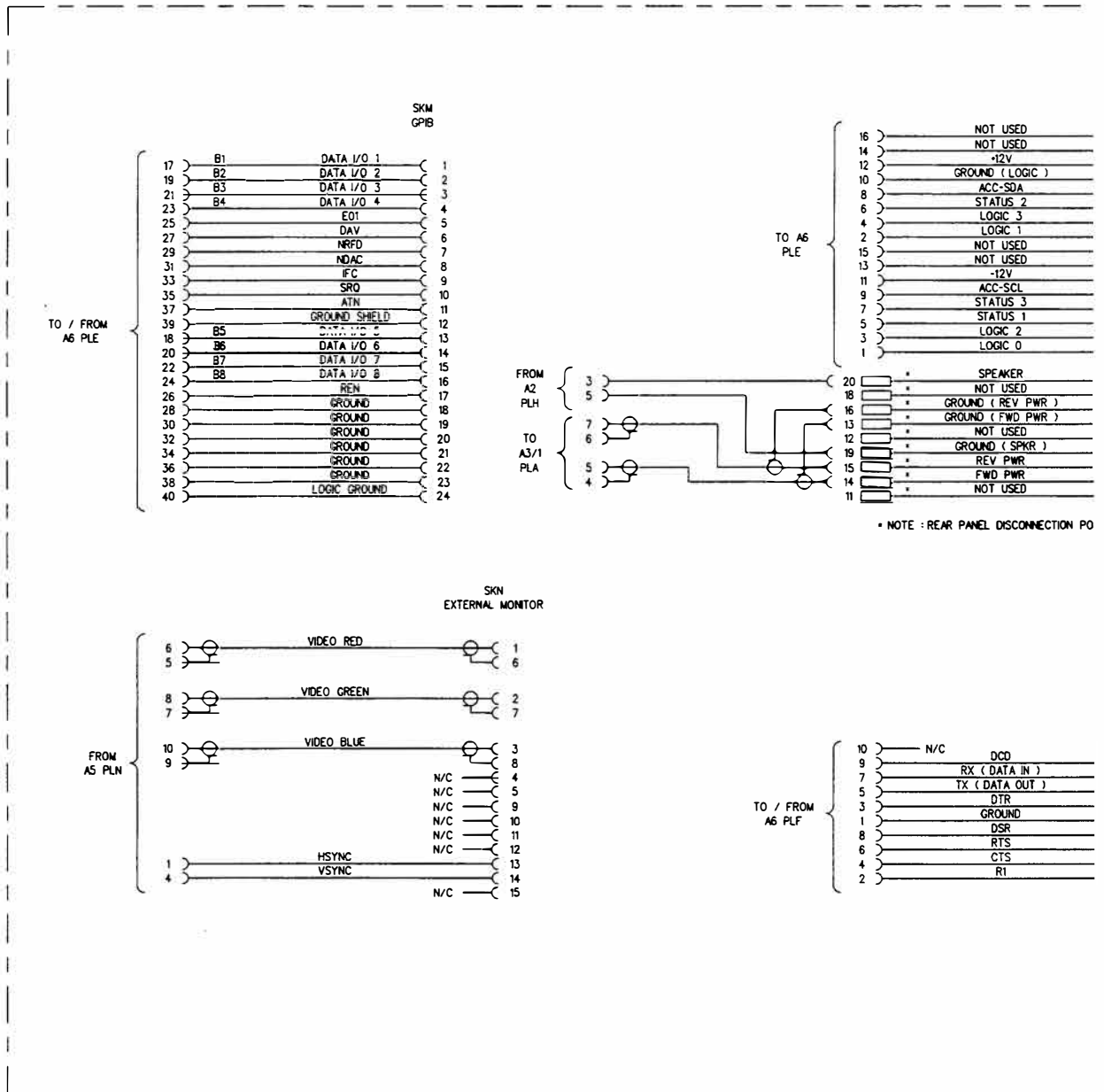


Fig. 7-7 Interconnections - front panel



## Interconnections - rear panel

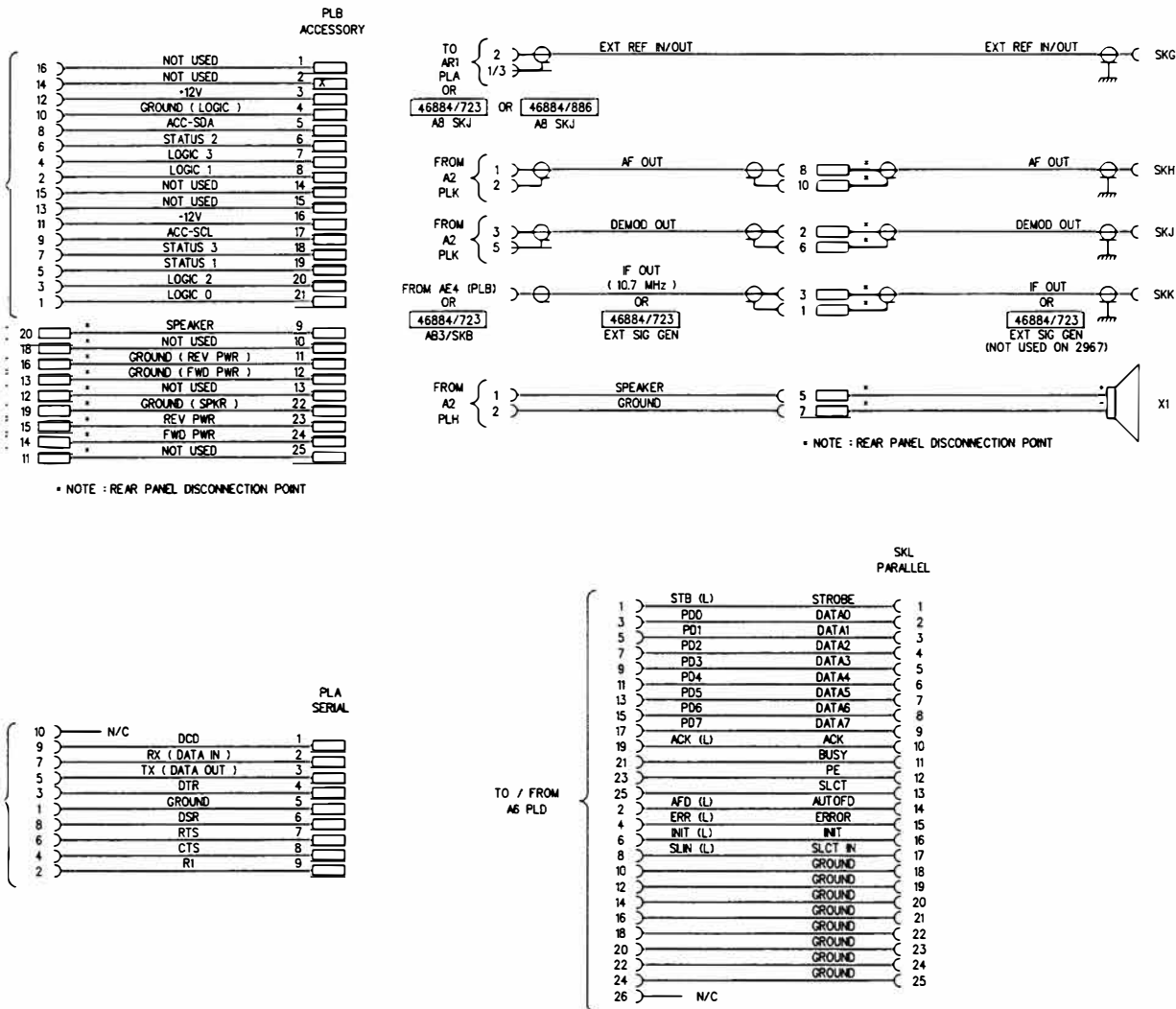
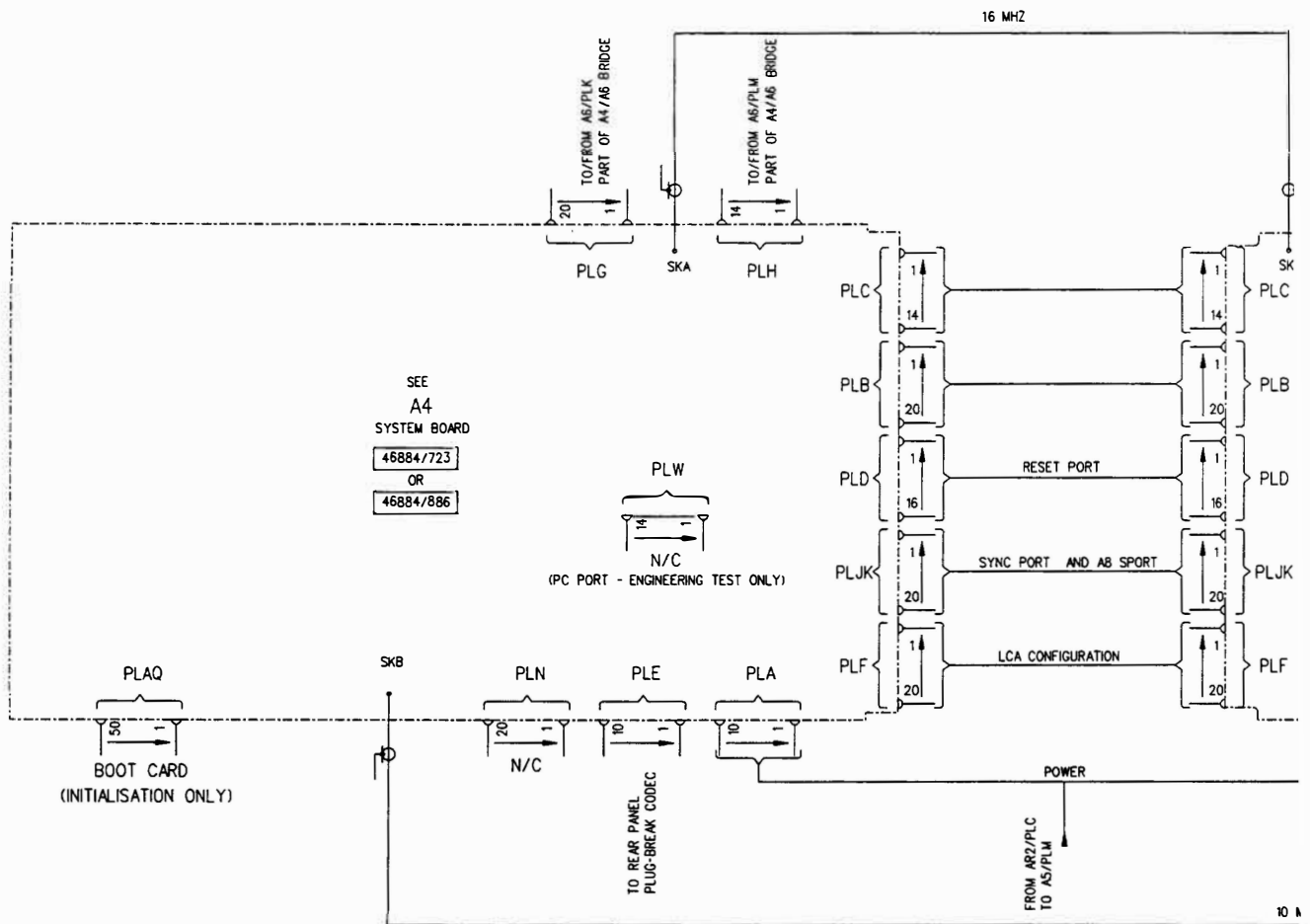
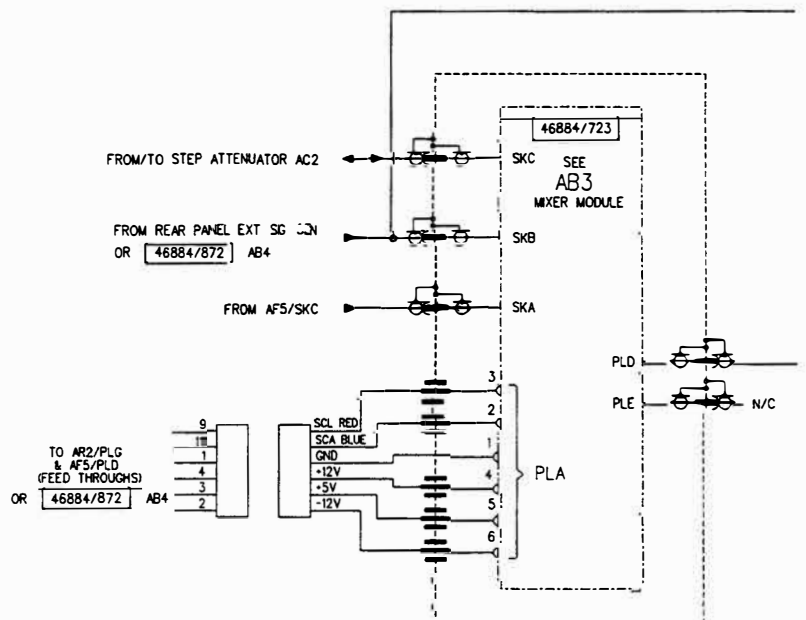


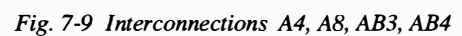
Fig. 7-8 Interconnections - rear panel

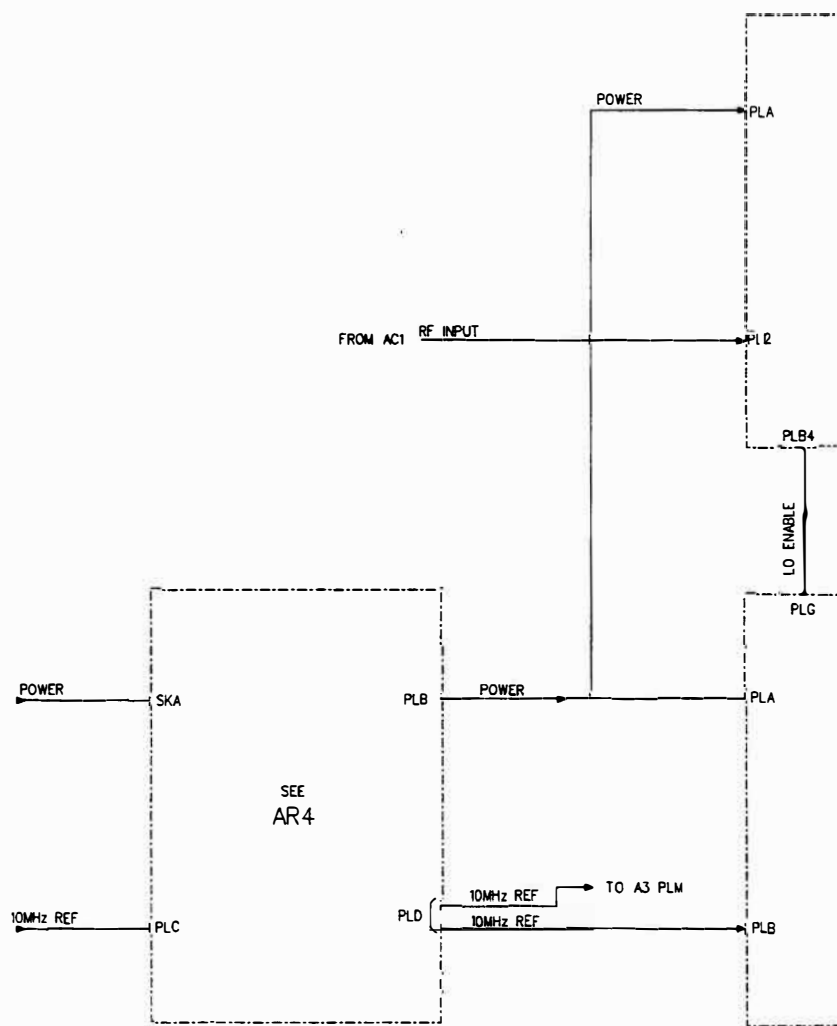


#### NOTES.

- ON 2967 INSTRUMENTS BOTH 46884/882 AND 46884/886 ARE FITTED.
- IF WARPING OPTION 46884/872 IS FITTED, THEN EITHER 46884/723 OR BOTH 46884/882 AND 46884/886 IS REQUIRED.







# Interconnections **AK1, AK2, AR4**

NOTE.

1. AR4, AK1 AND AK2 ARE USED ONLY IN

46884/882

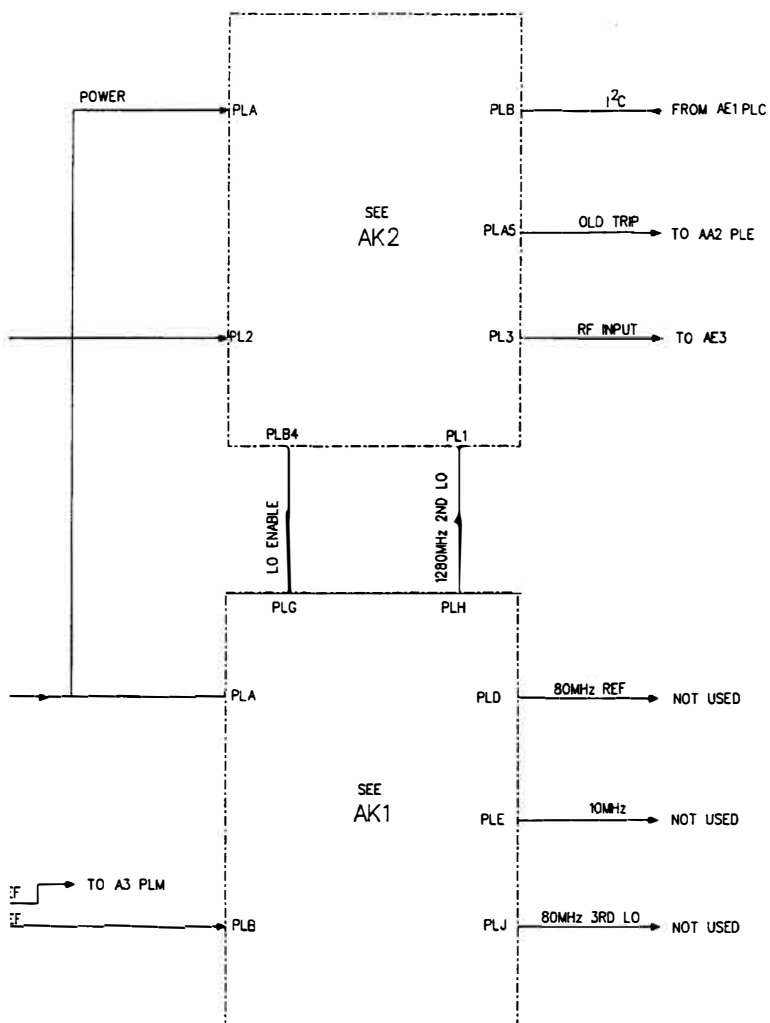
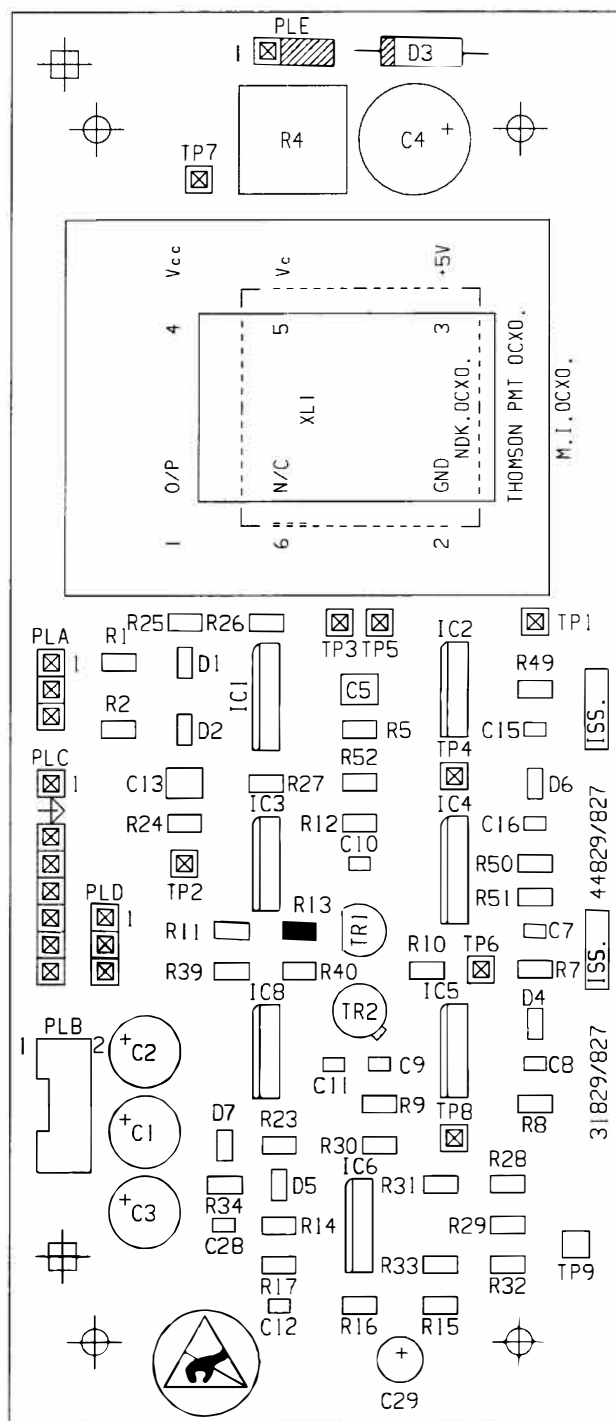
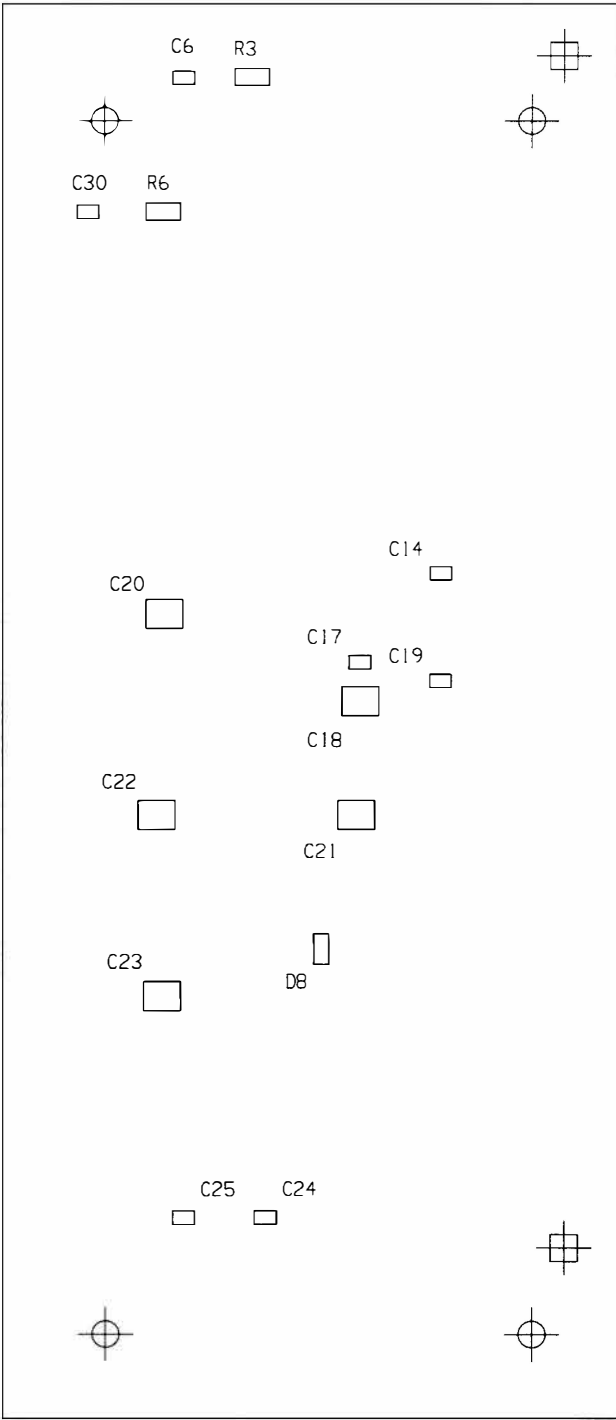
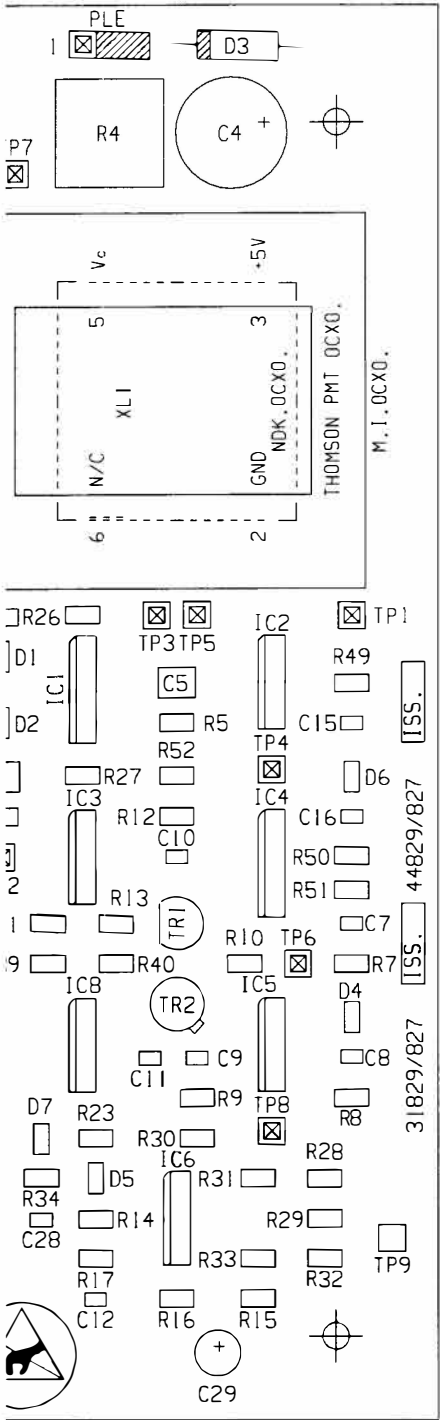


Fig. 7-10 Interconnections AK1, AK2, AR4





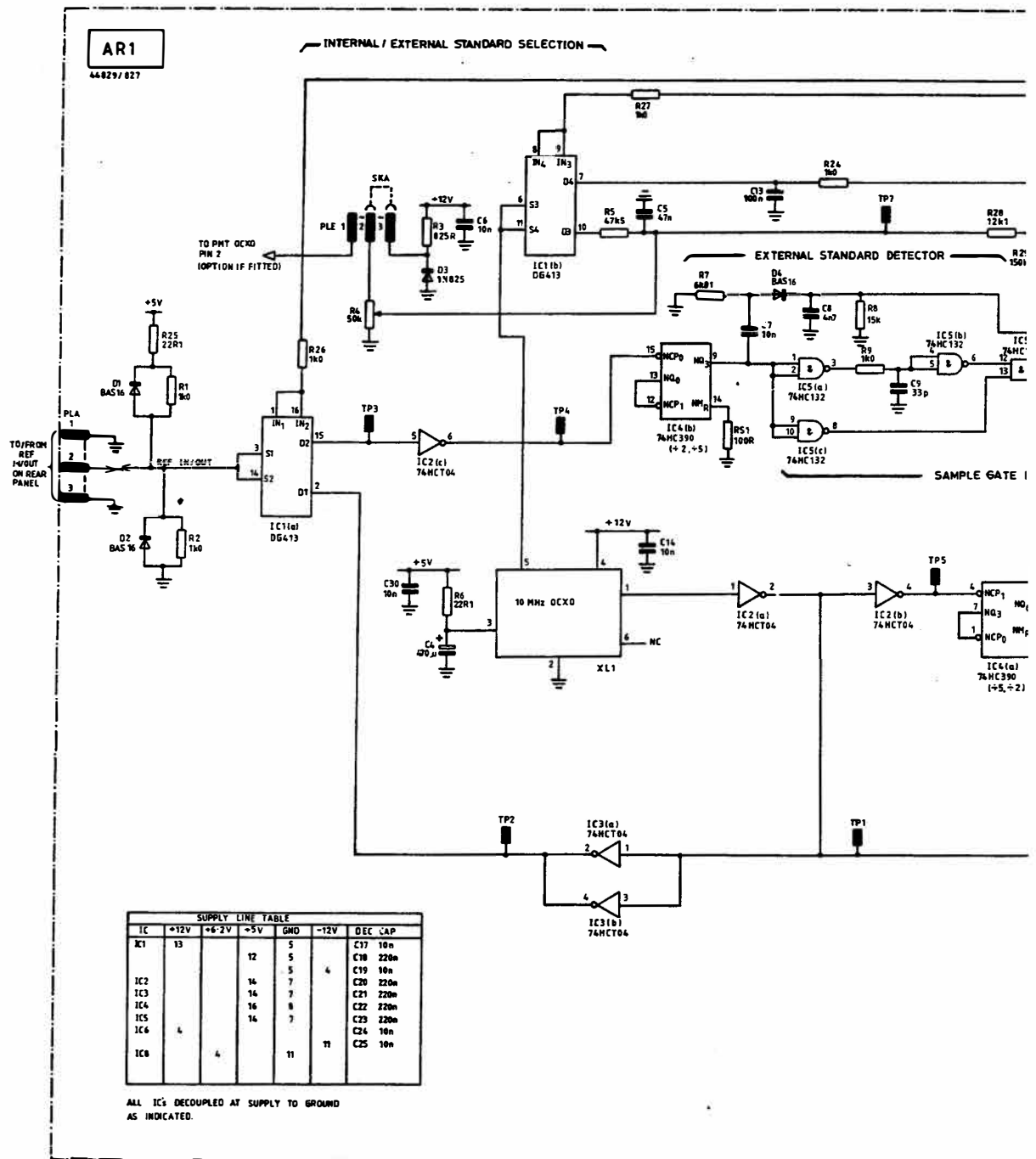
Component layout **AR1**



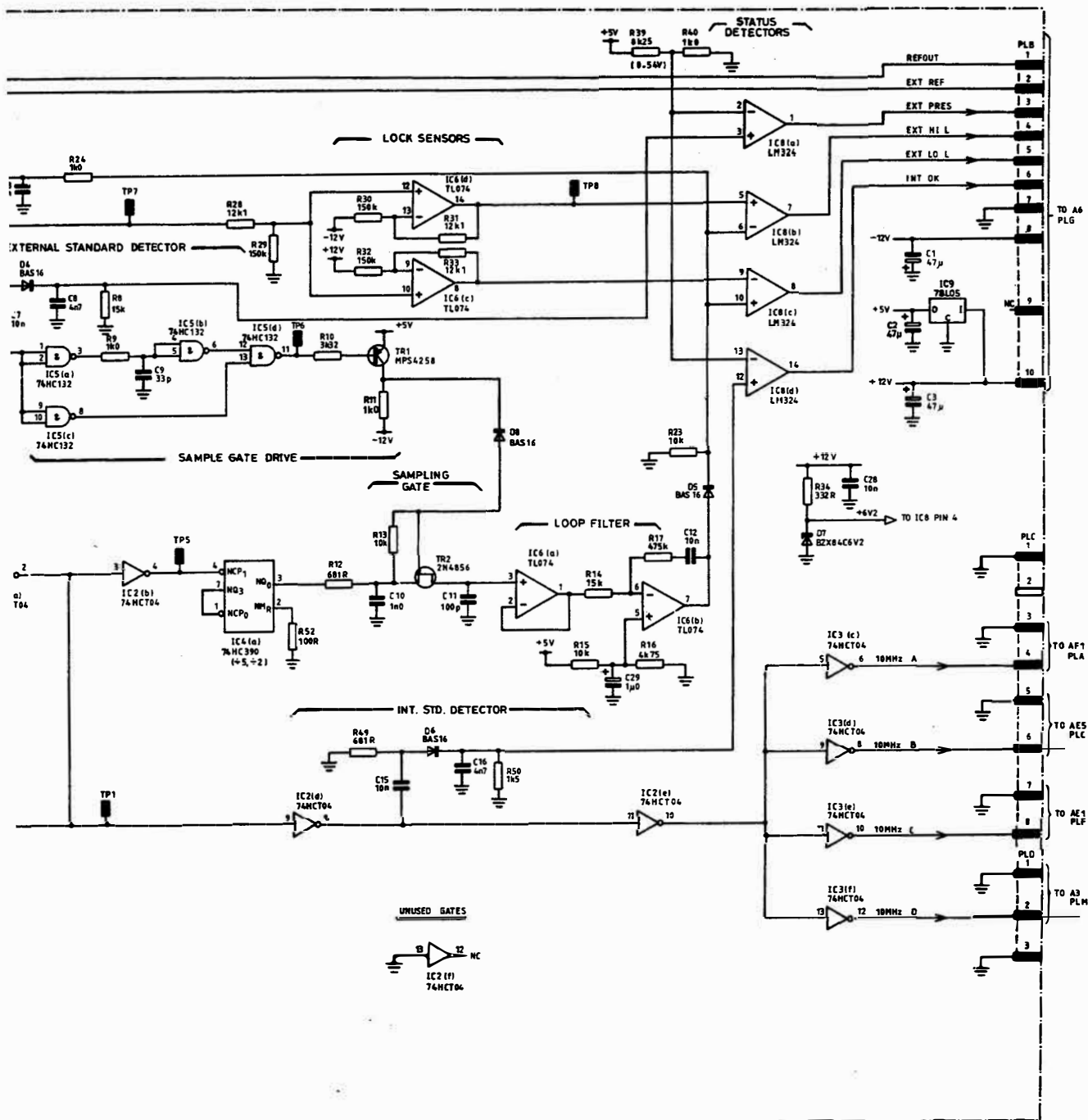
**R4**

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Fig. 7-11 AR1 10 MHz OCXO - component layout



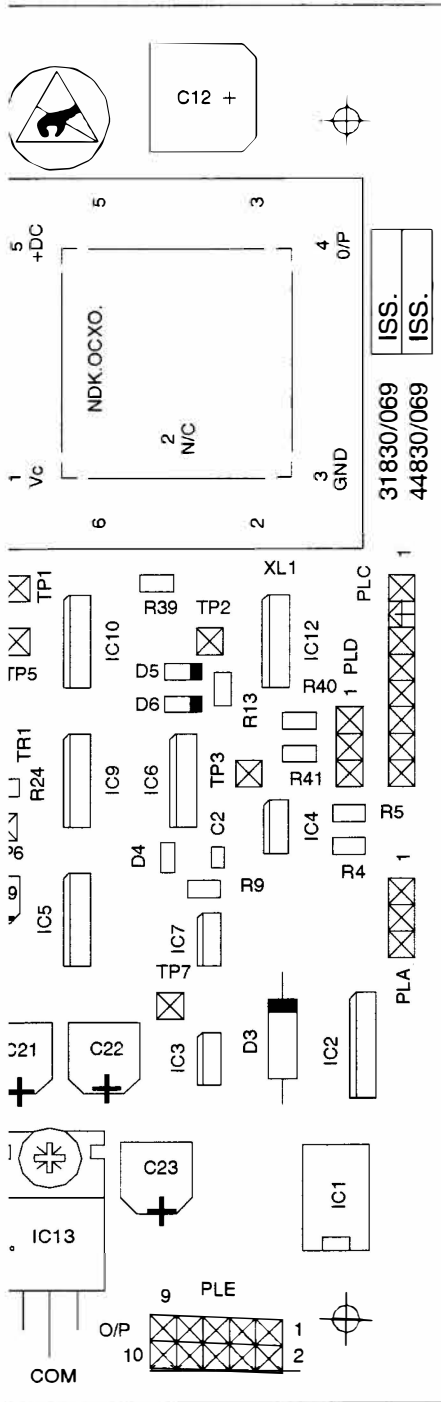
## Circuit diagram AR1

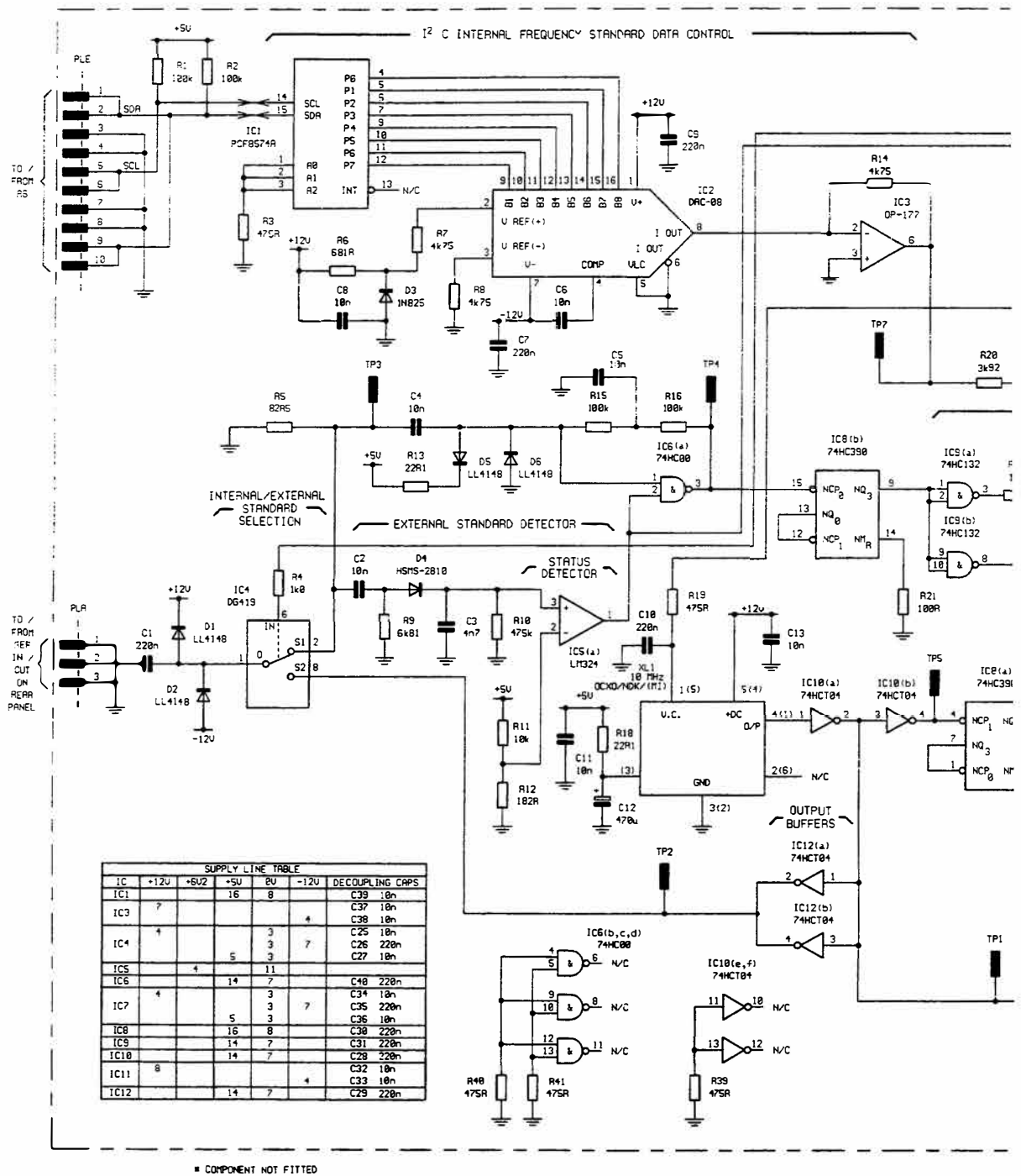


*Fig. 7-12 AR1 10 MHz OCXO - circuit*

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# Component layout AR1/2





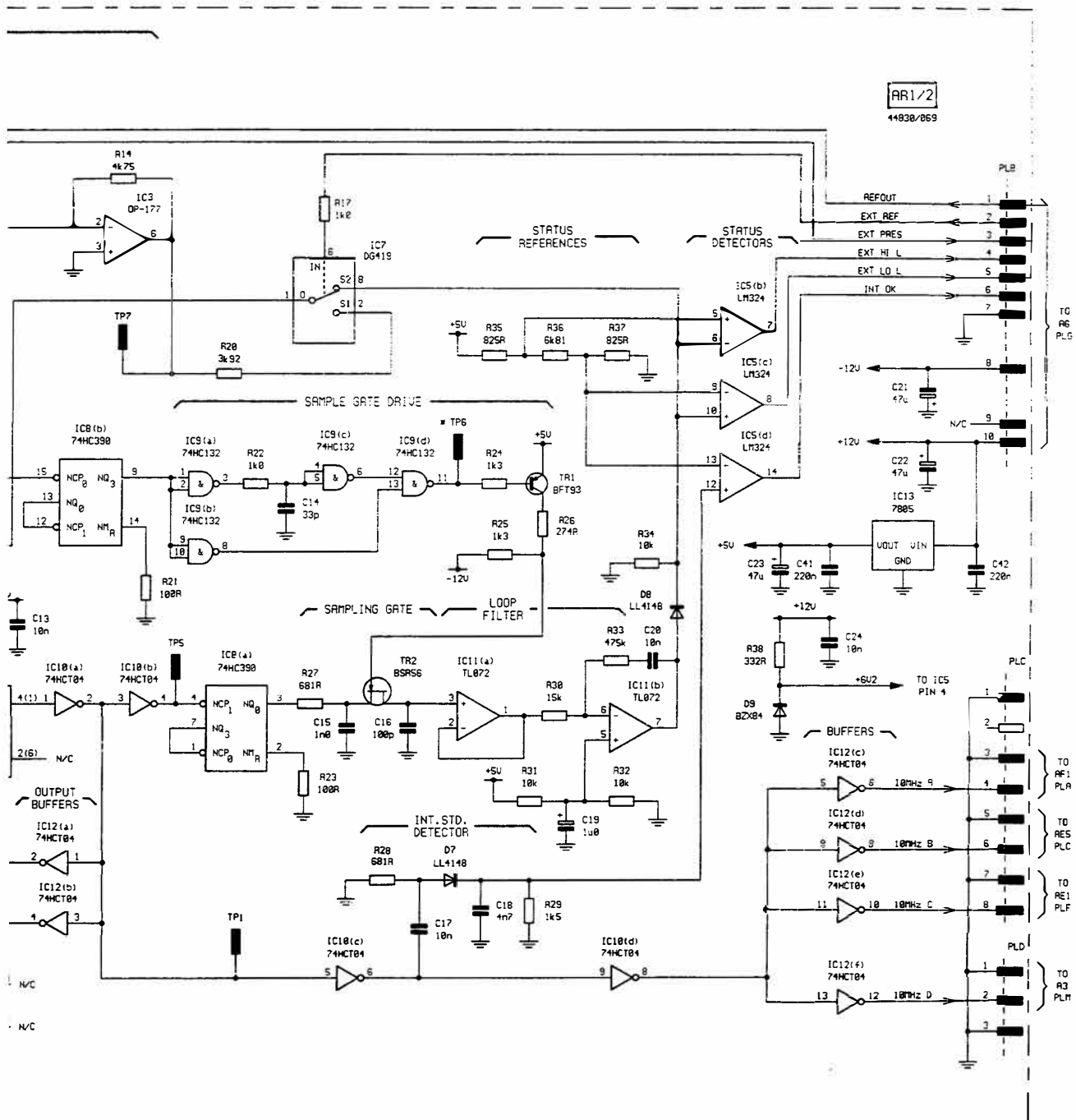
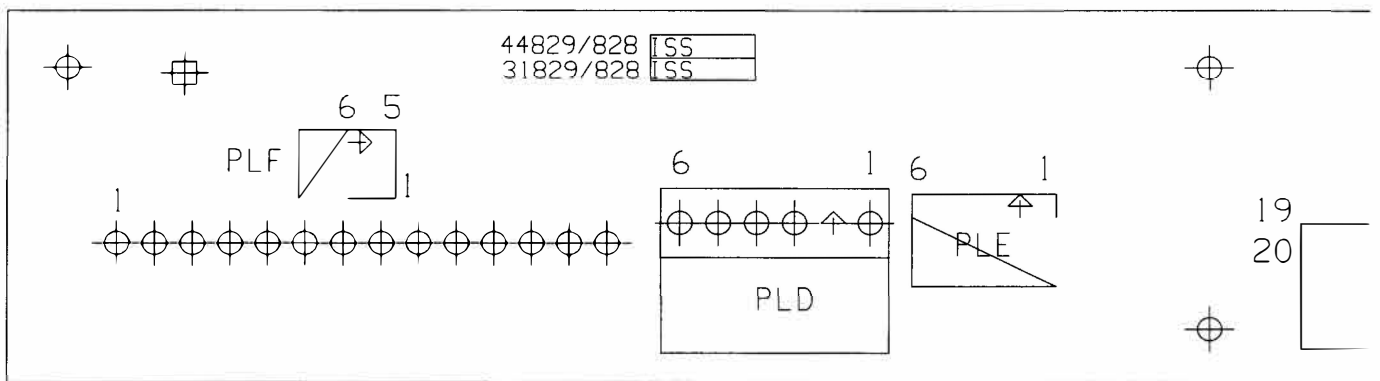
Circuit diagram **AR1/2**

Fig. 7-14 AR1/2 10 MHz OCXO - circuit

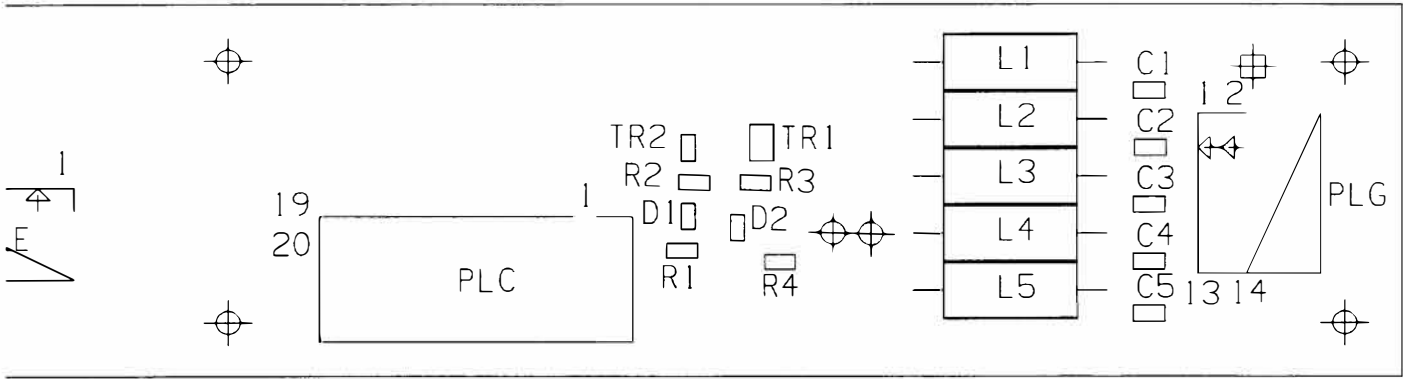


10 MHz OCXO AR1/2

Drg. No. 44829/828 Sheet



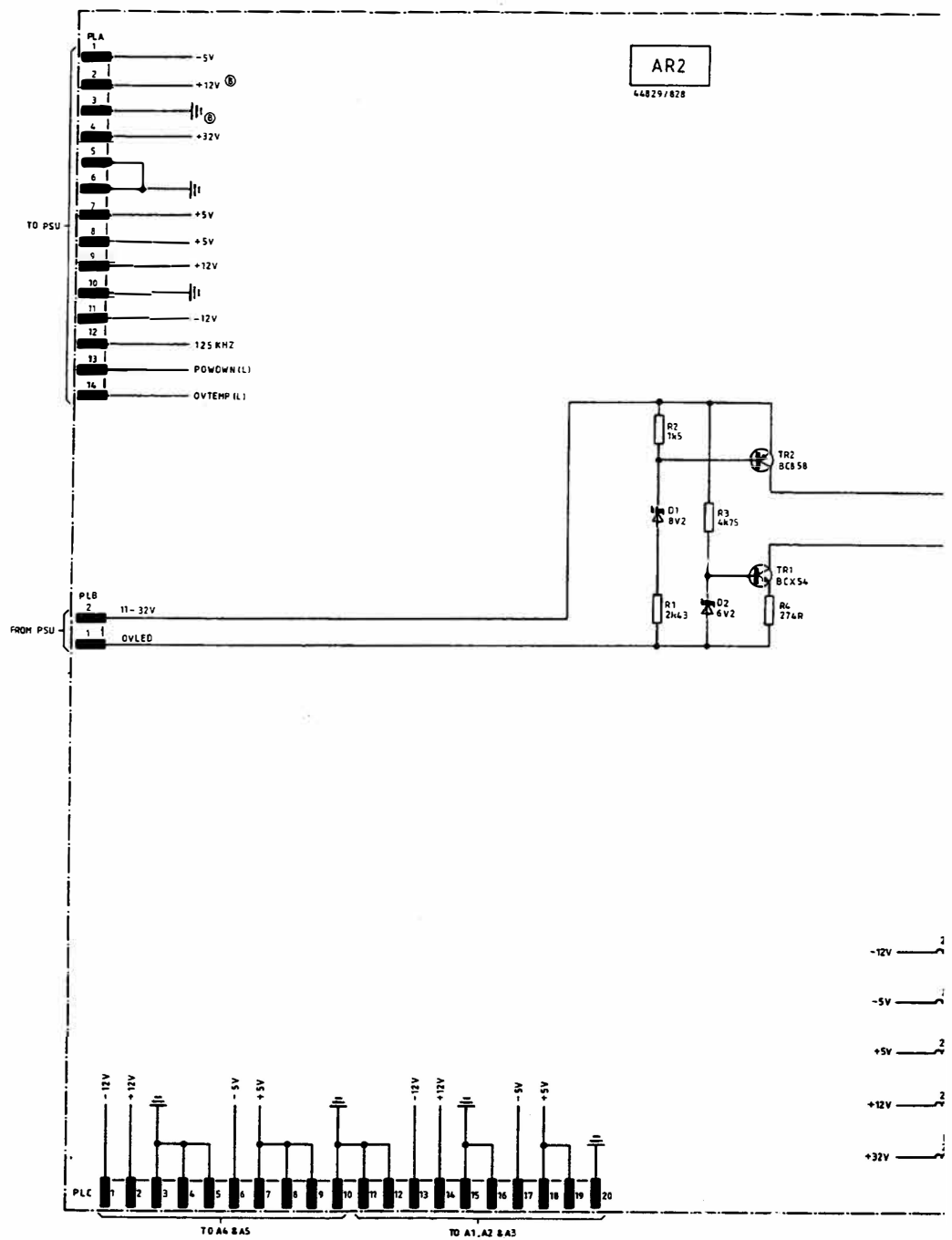
Component layout **AR2**



**R1/2**

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Fig. 7-15 AR2 PSU distribution - component layout



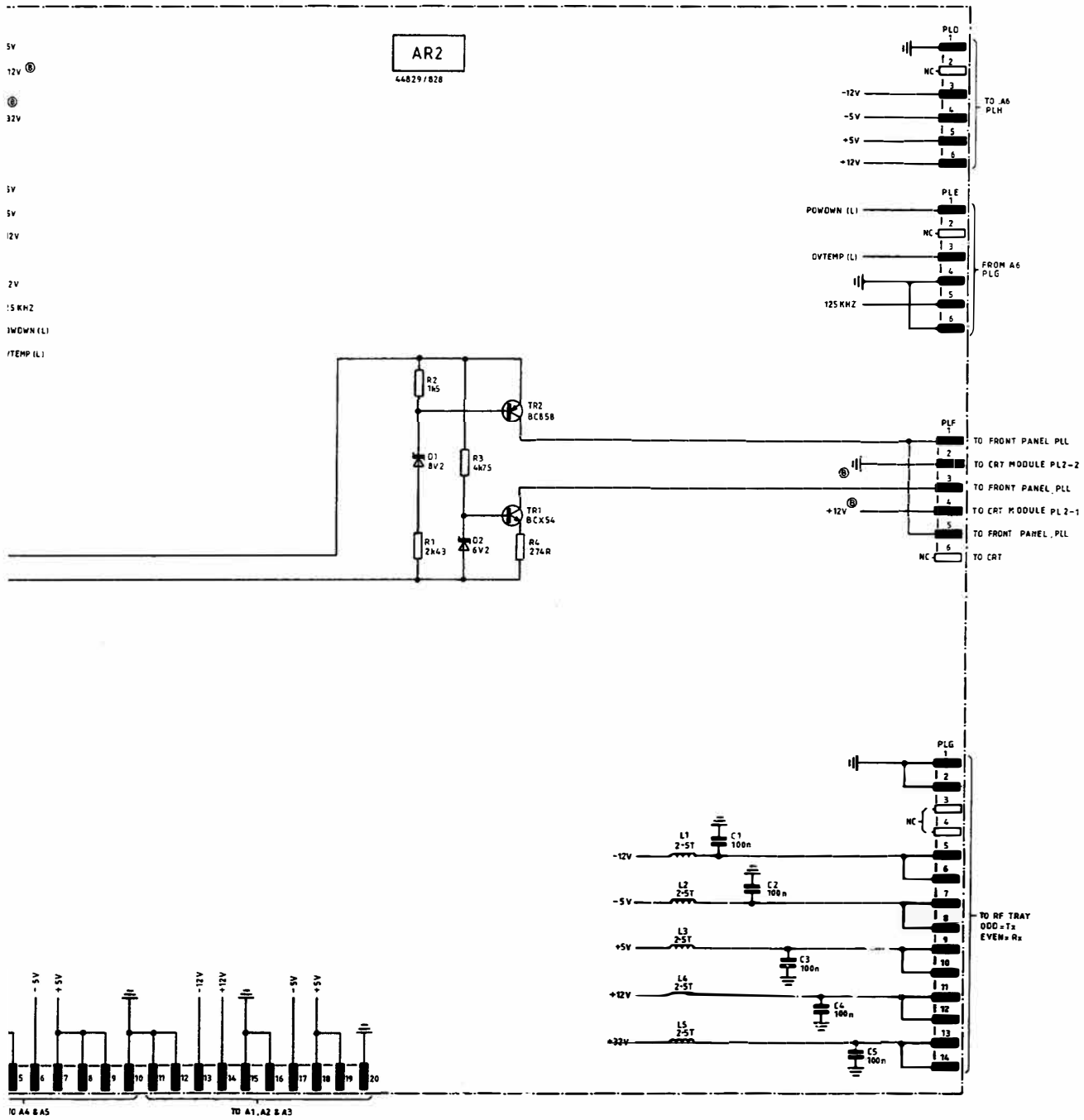
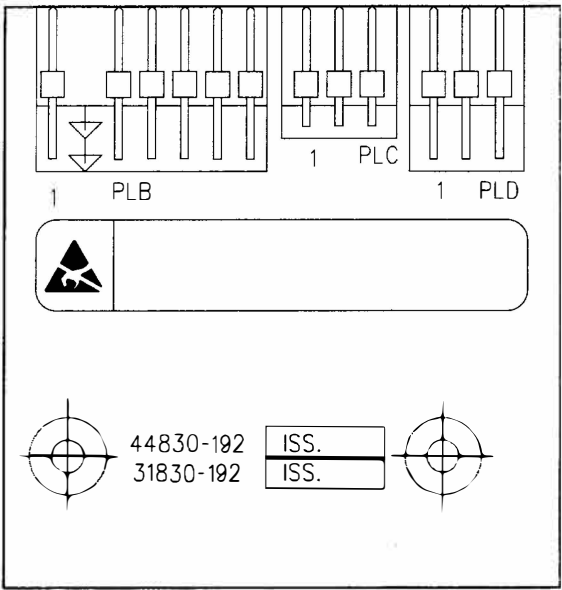
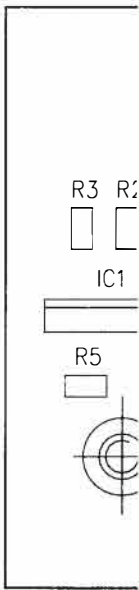
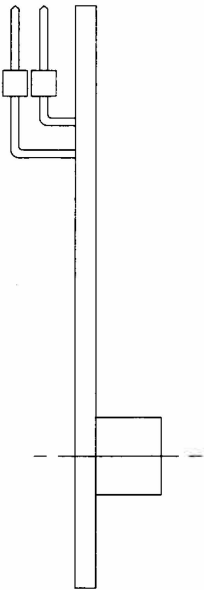
Circuit diagram **AR2**

Fig. 7-16 AR2 PSU distribution - circuit



COMPONENT SIDE

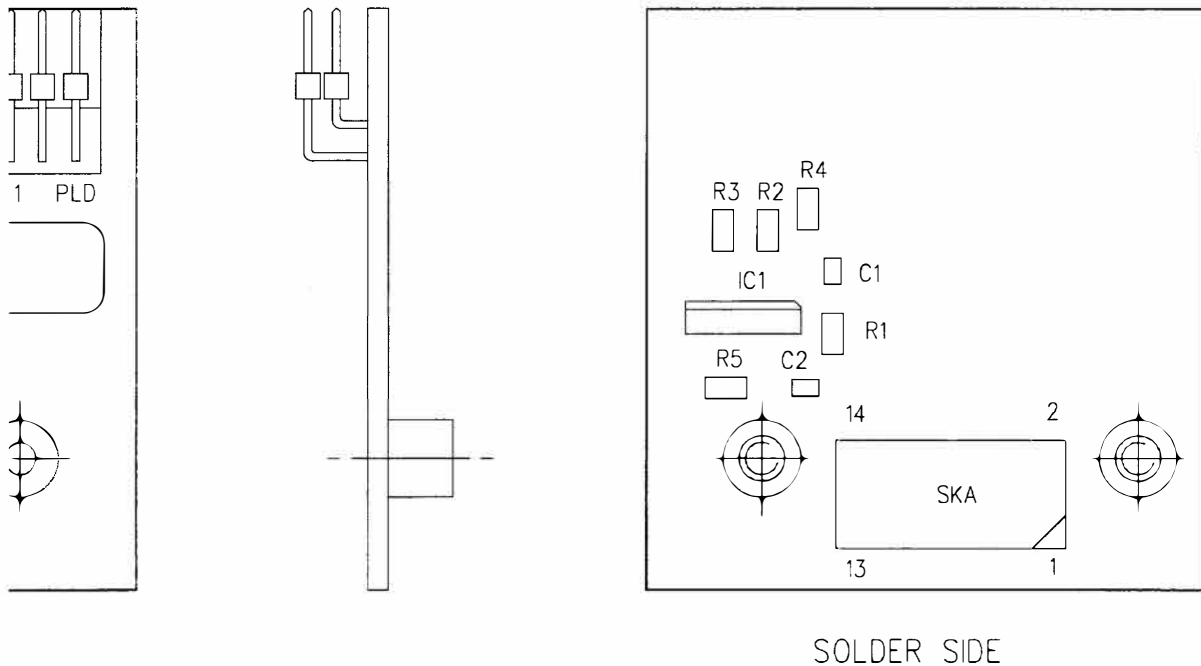


**PSU distribution AR2**

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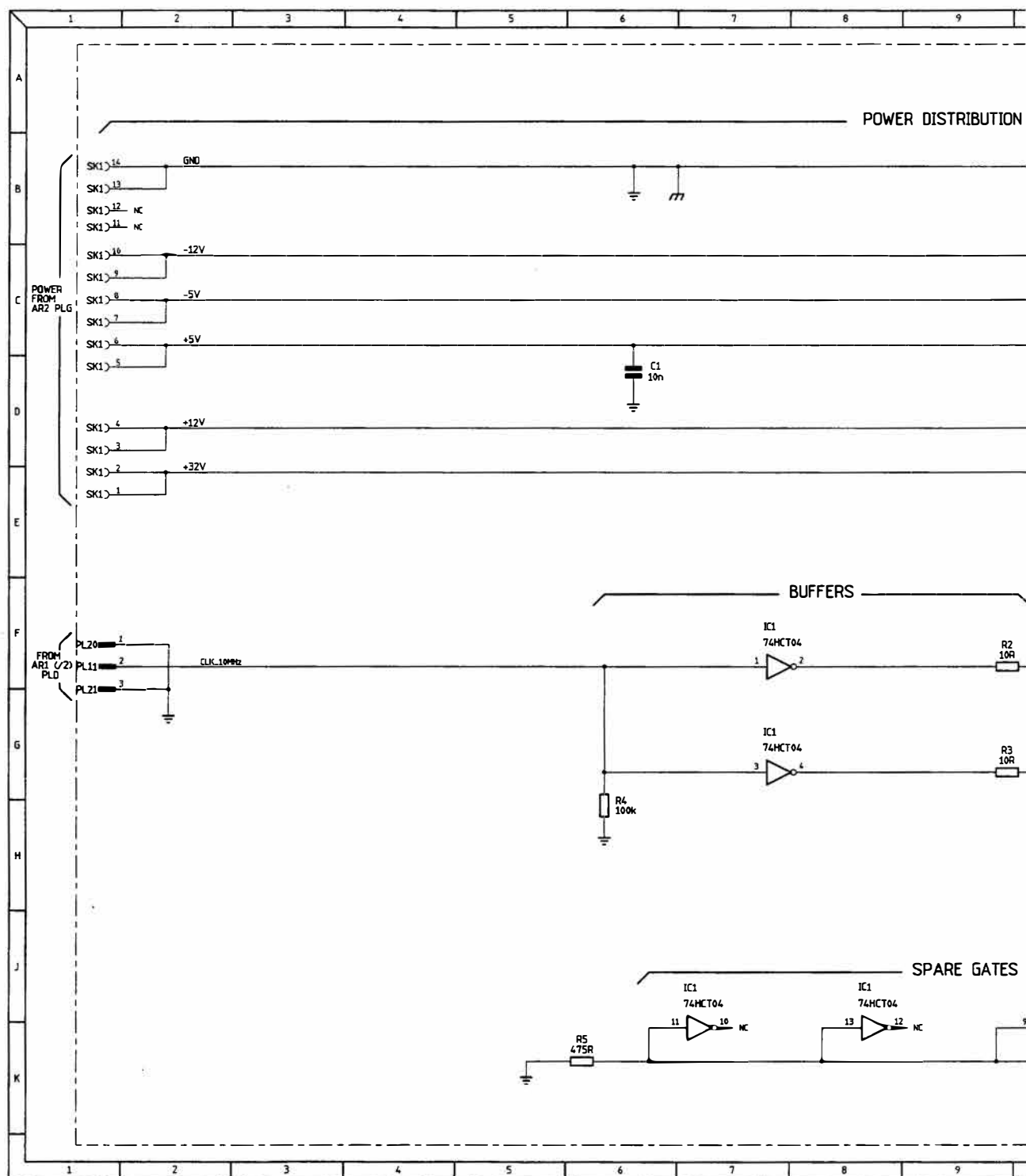
# Component layout **AR4**



**AR2**

Drg. No. 44830/192 Sheet 1 of 1 Issue 2

Fig. 7-17 AR4 10 MHz oscillator buffer - component layout



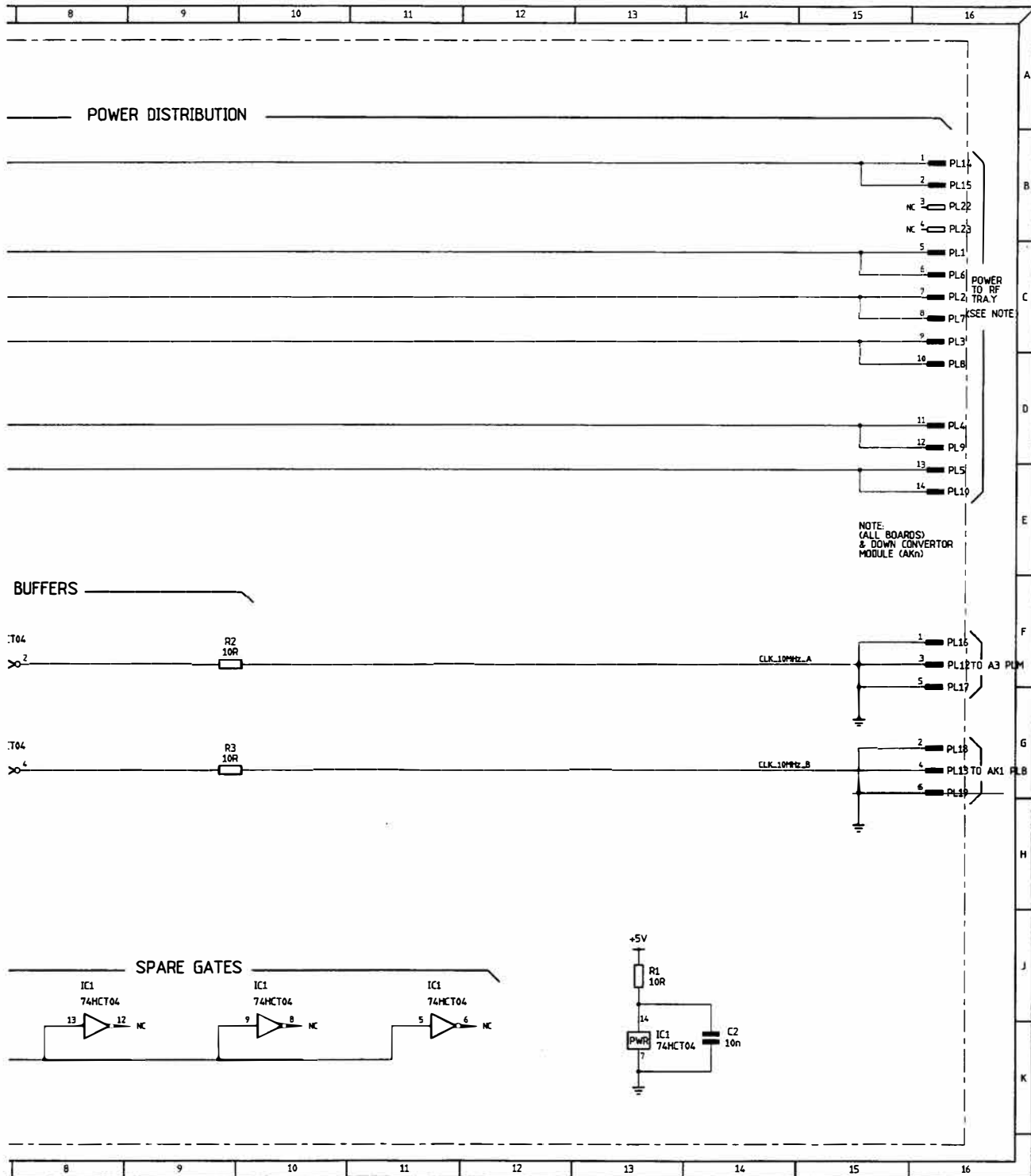
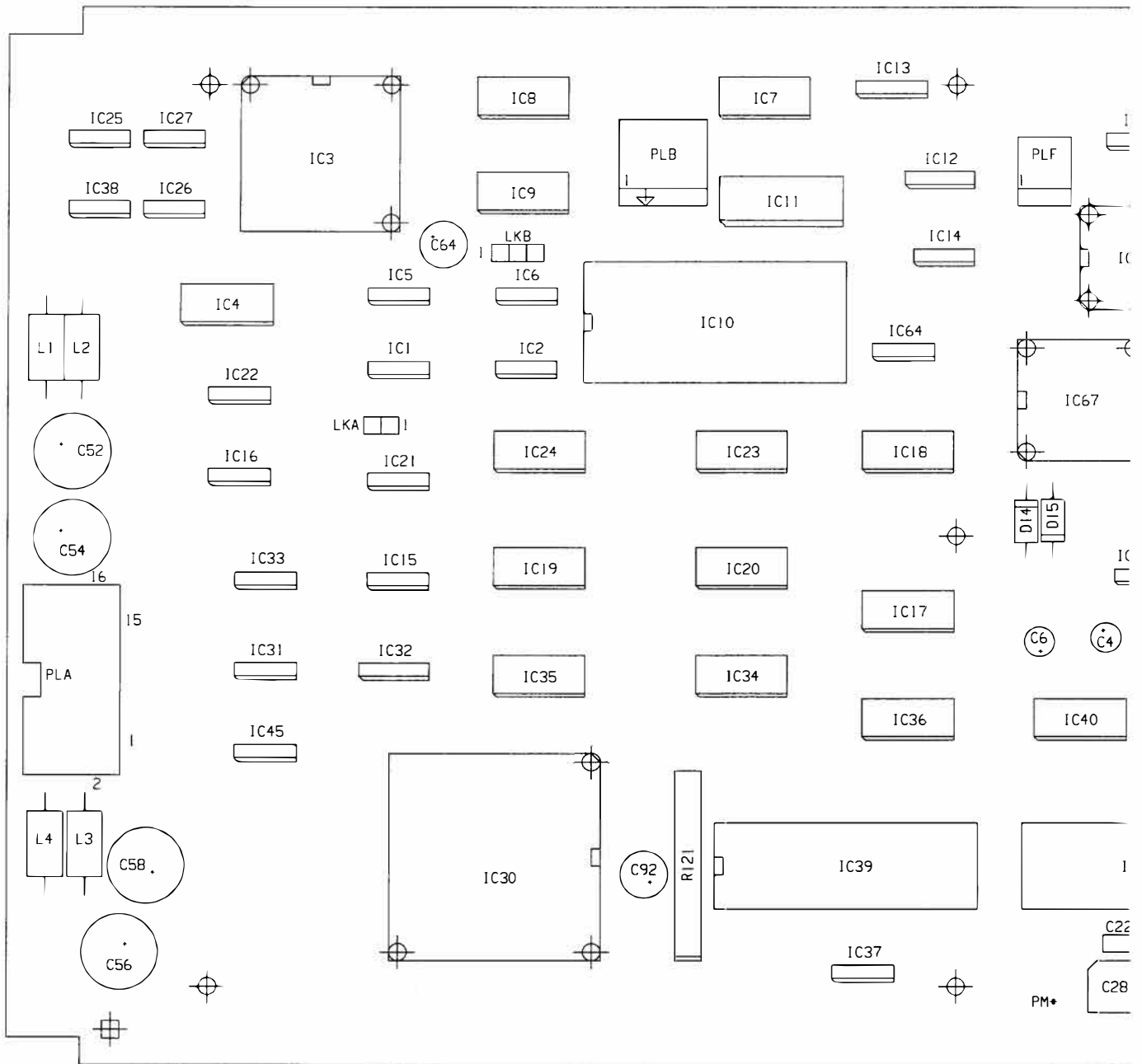
Circuit diagram **AR4**

Fig. 7-18 AR4 10 MHz oscillator buffer - circuit

# SERVICING DIAGRAMS

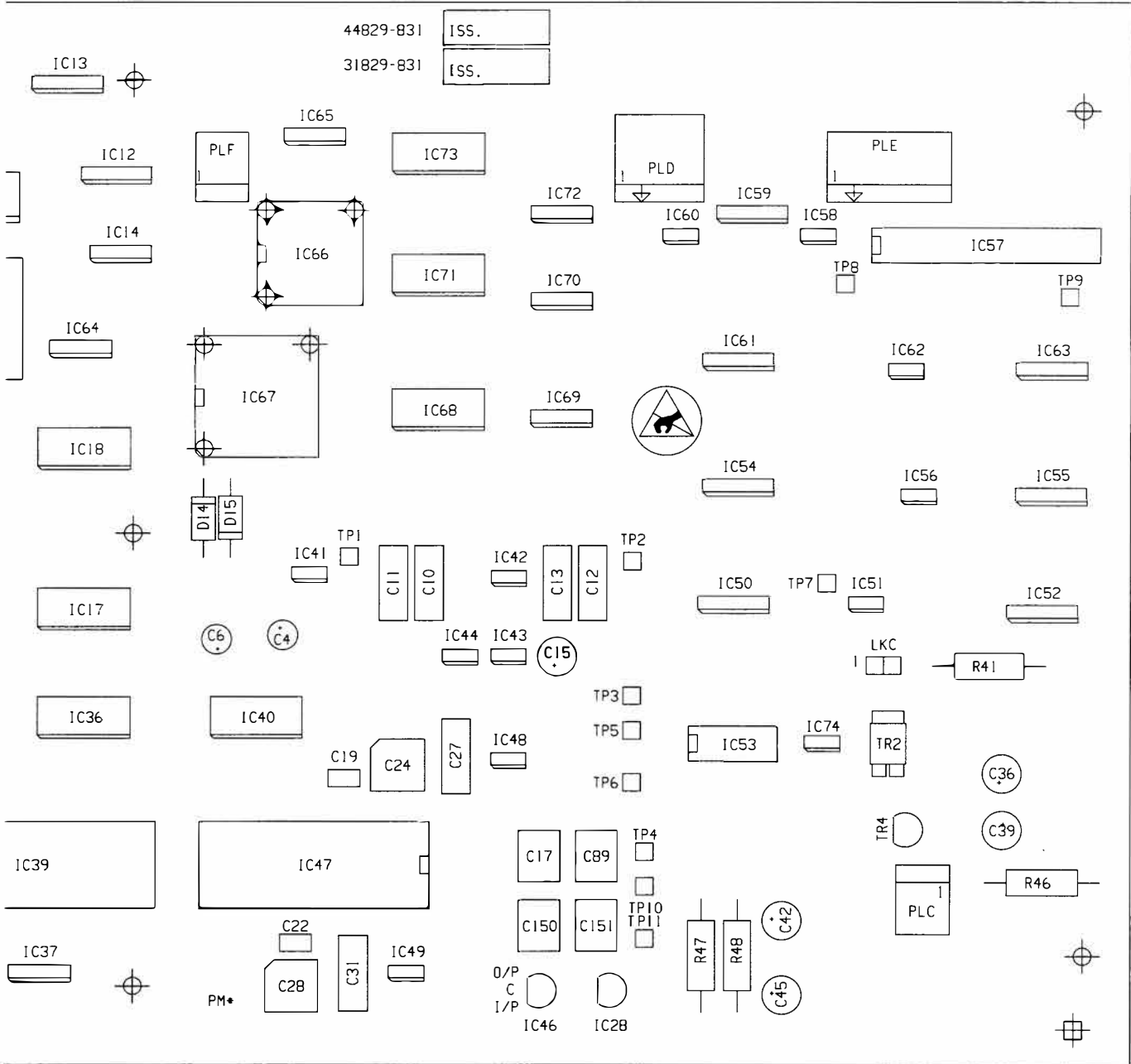


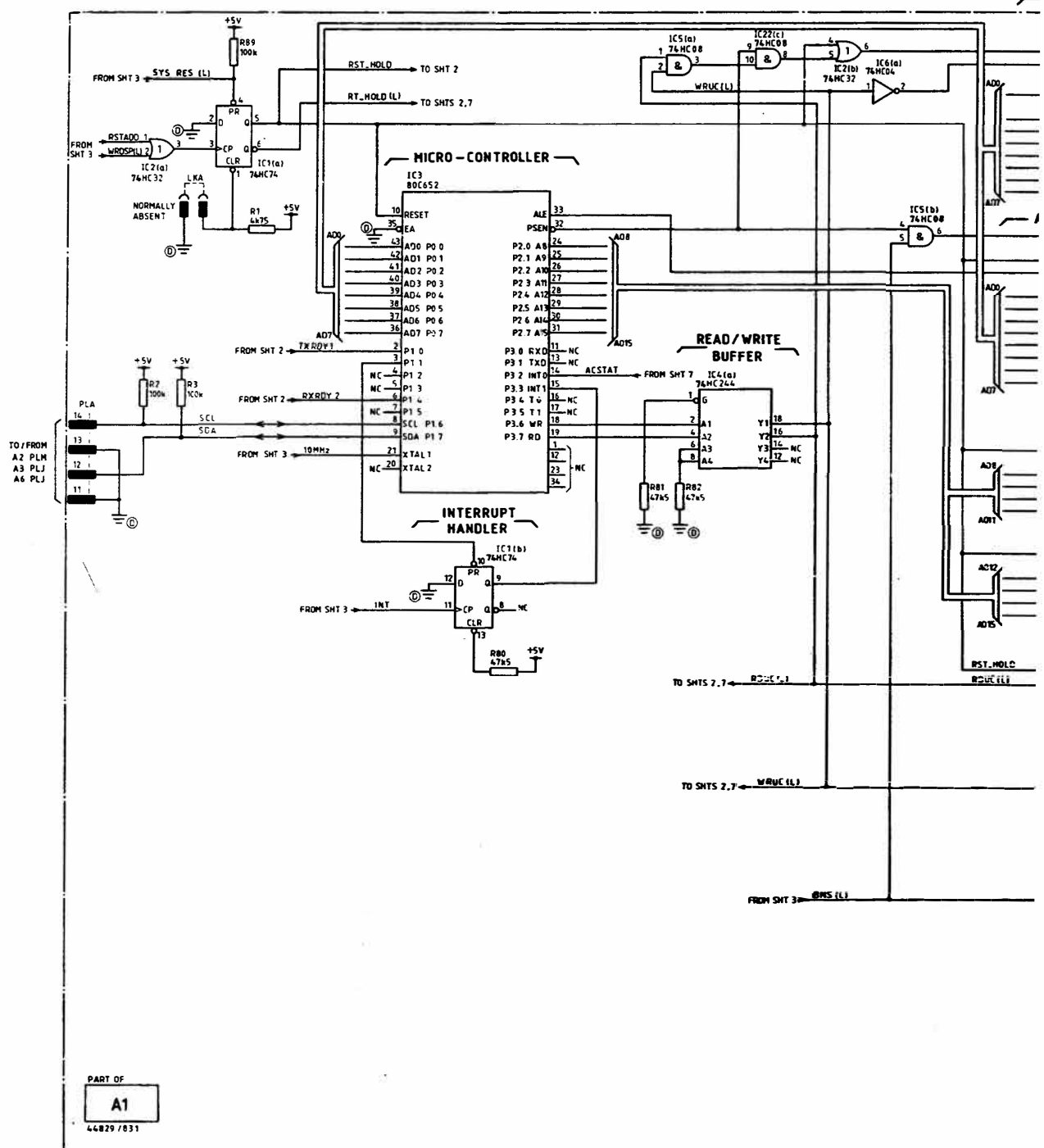
10 MHz oscillator buffer **AR4**

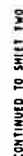
Drg. No. 44829/831 Sh



## Component layout A1





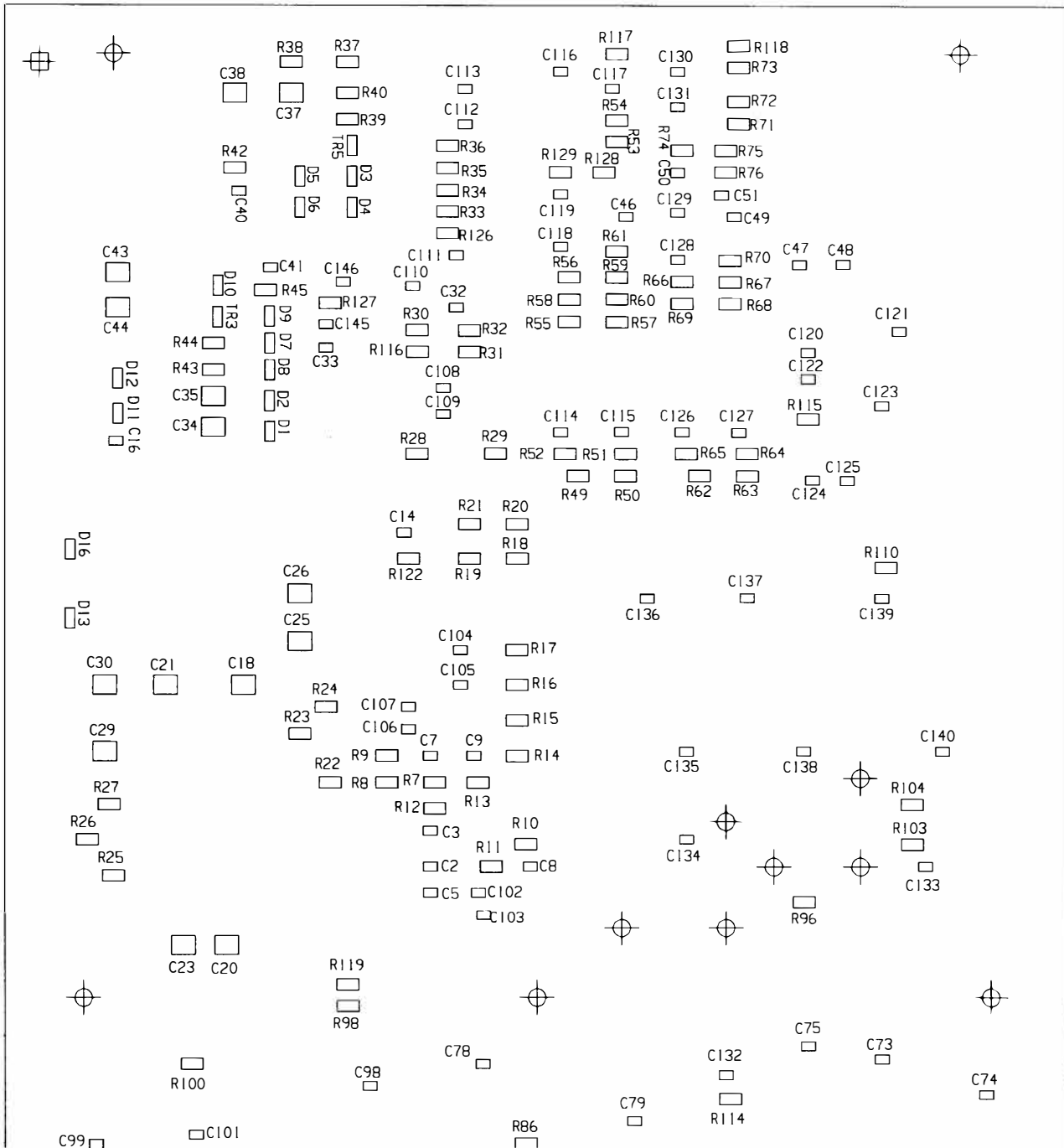


7-33

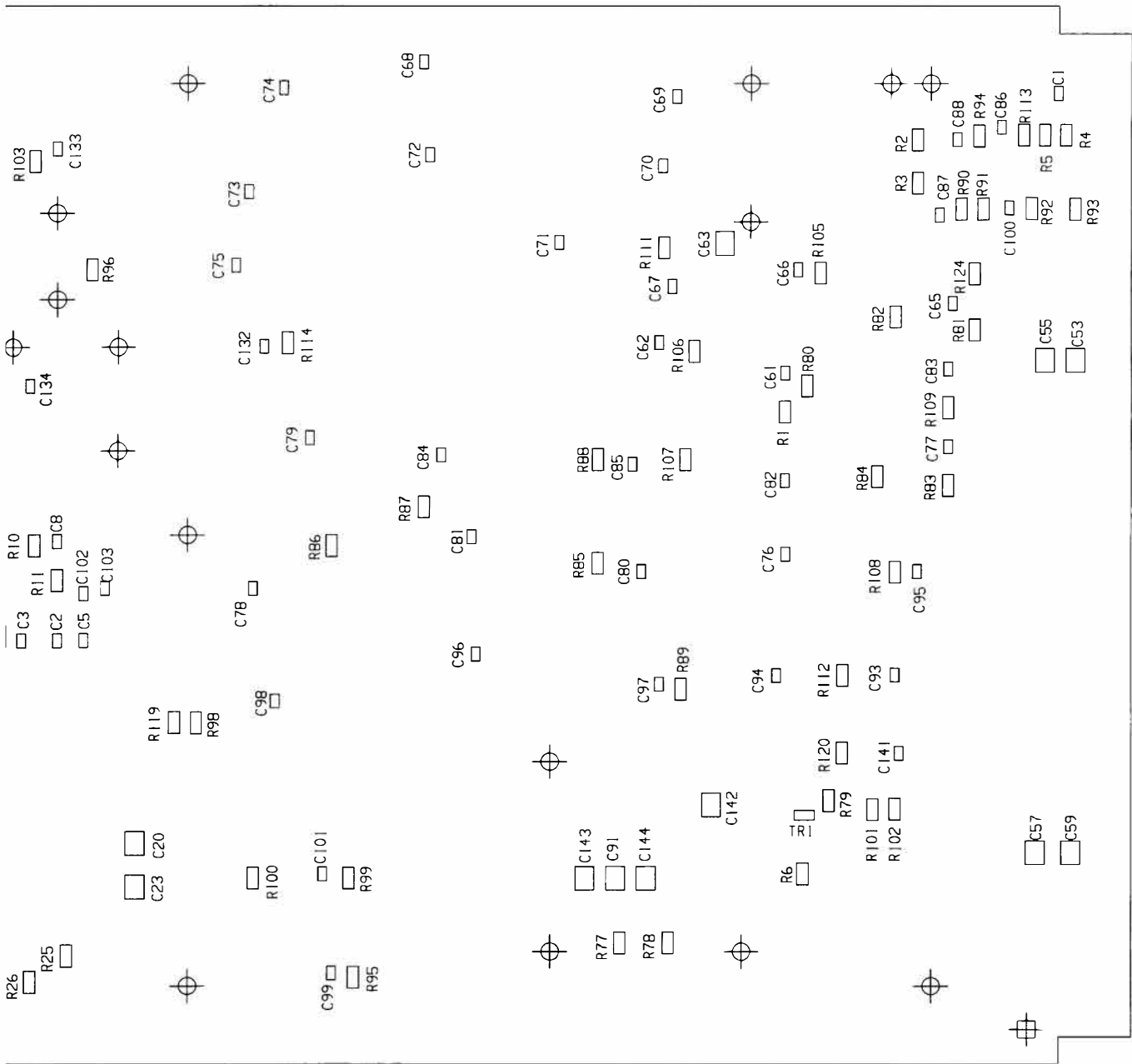
## Microprocessor memory and addressing A1

Drg. No. 44829/831 Sheet 2

7-34



## Component layout A1



**A1**

Drg. No. 44829/831 Sheet 2 of 2 Issue 2

*Fig. 7-21 A1 Audio generator - component layout, solder side*

46882-168



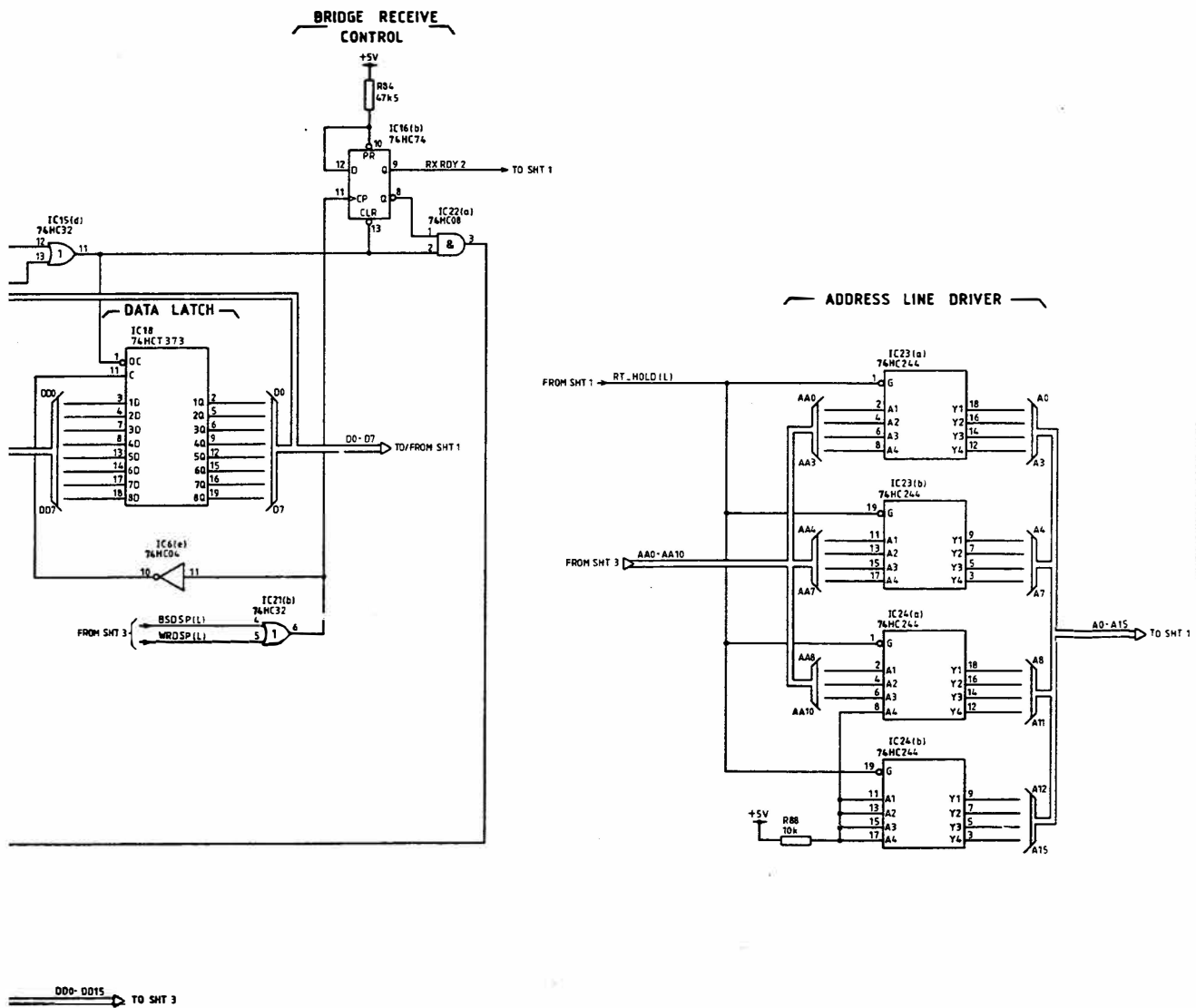
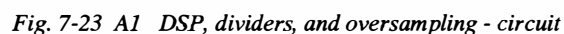
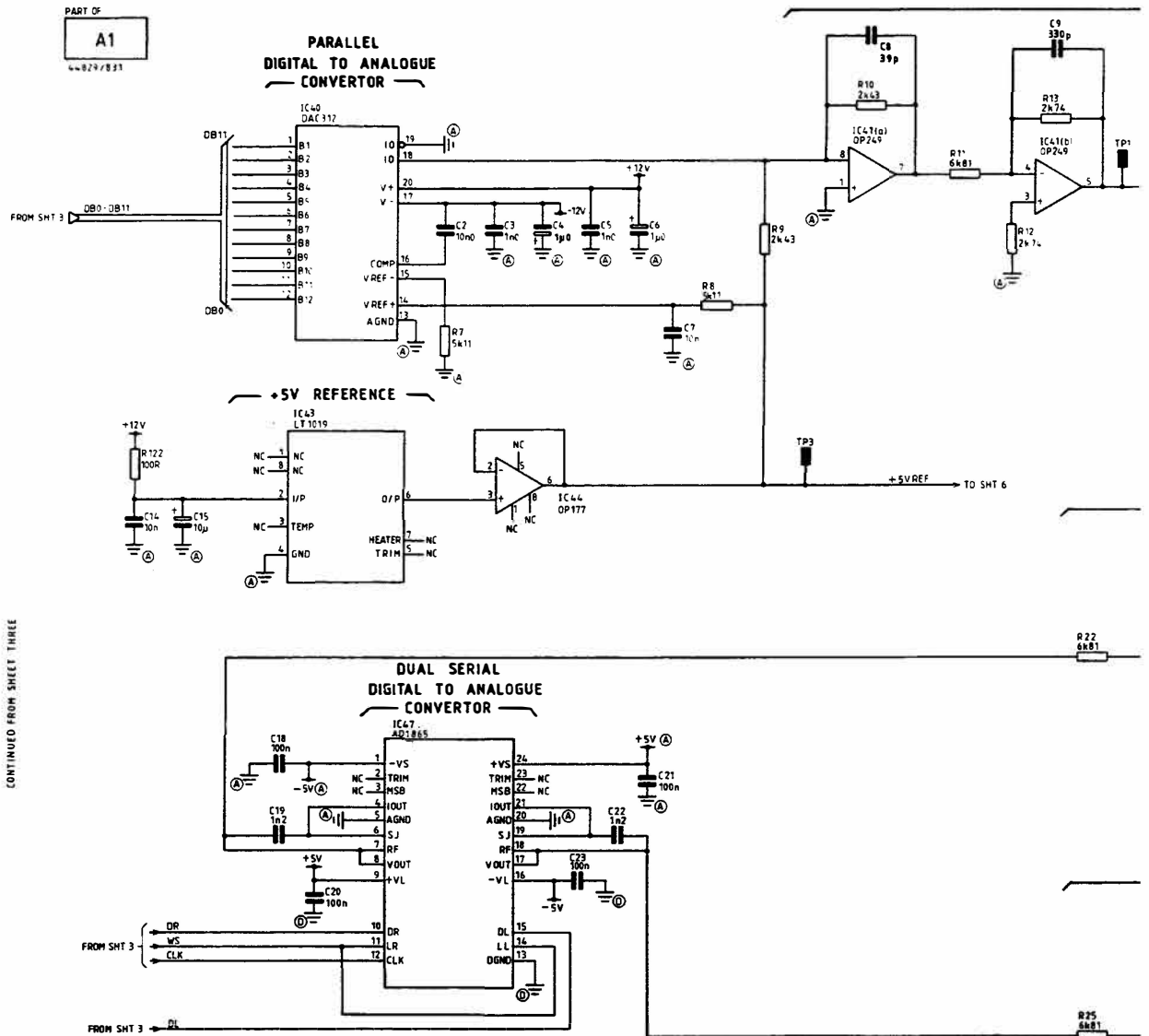
Circuit diagrams **A1**

Fig. 7-22 A1 Bridge and boot addressing - circuit









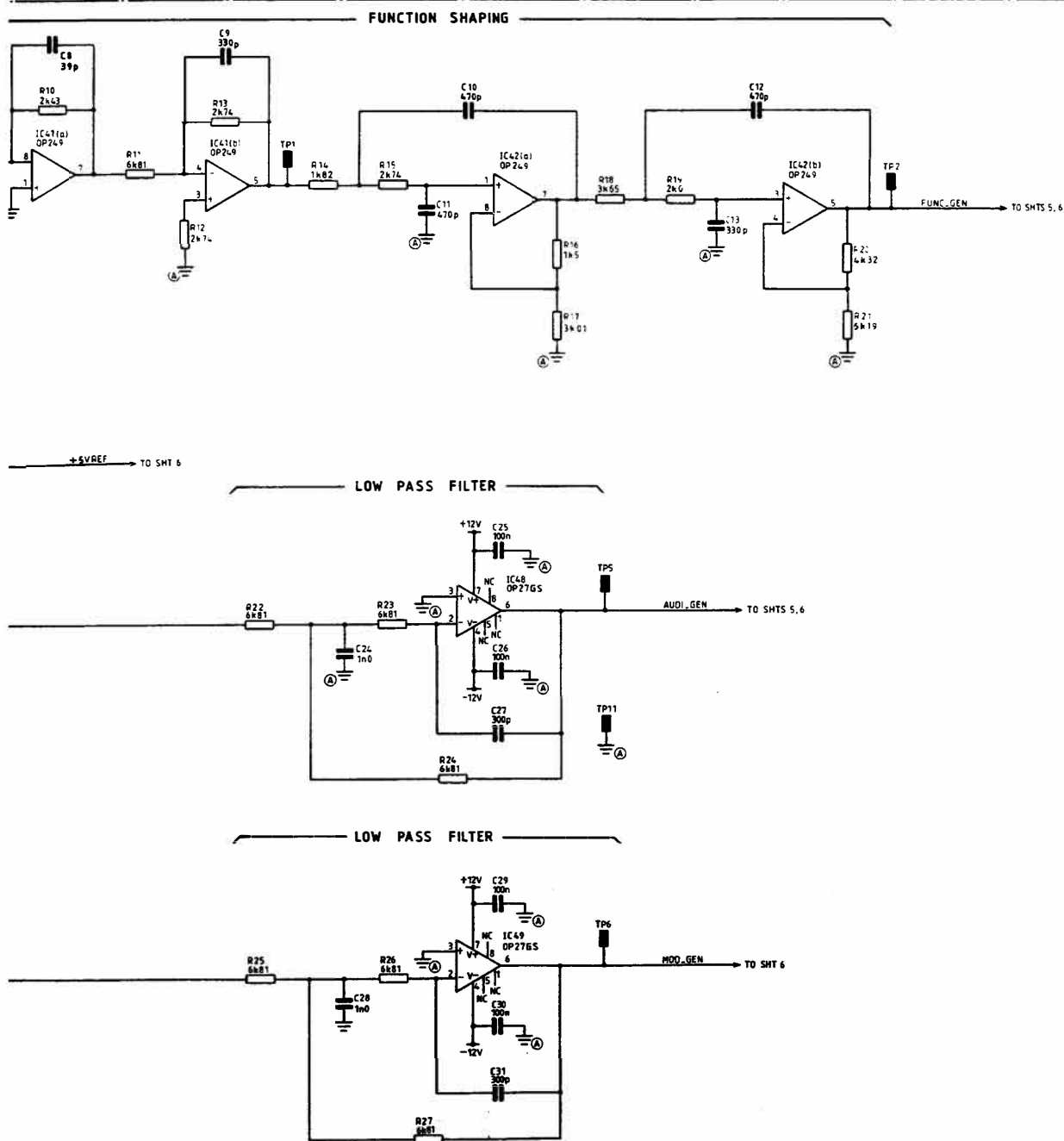
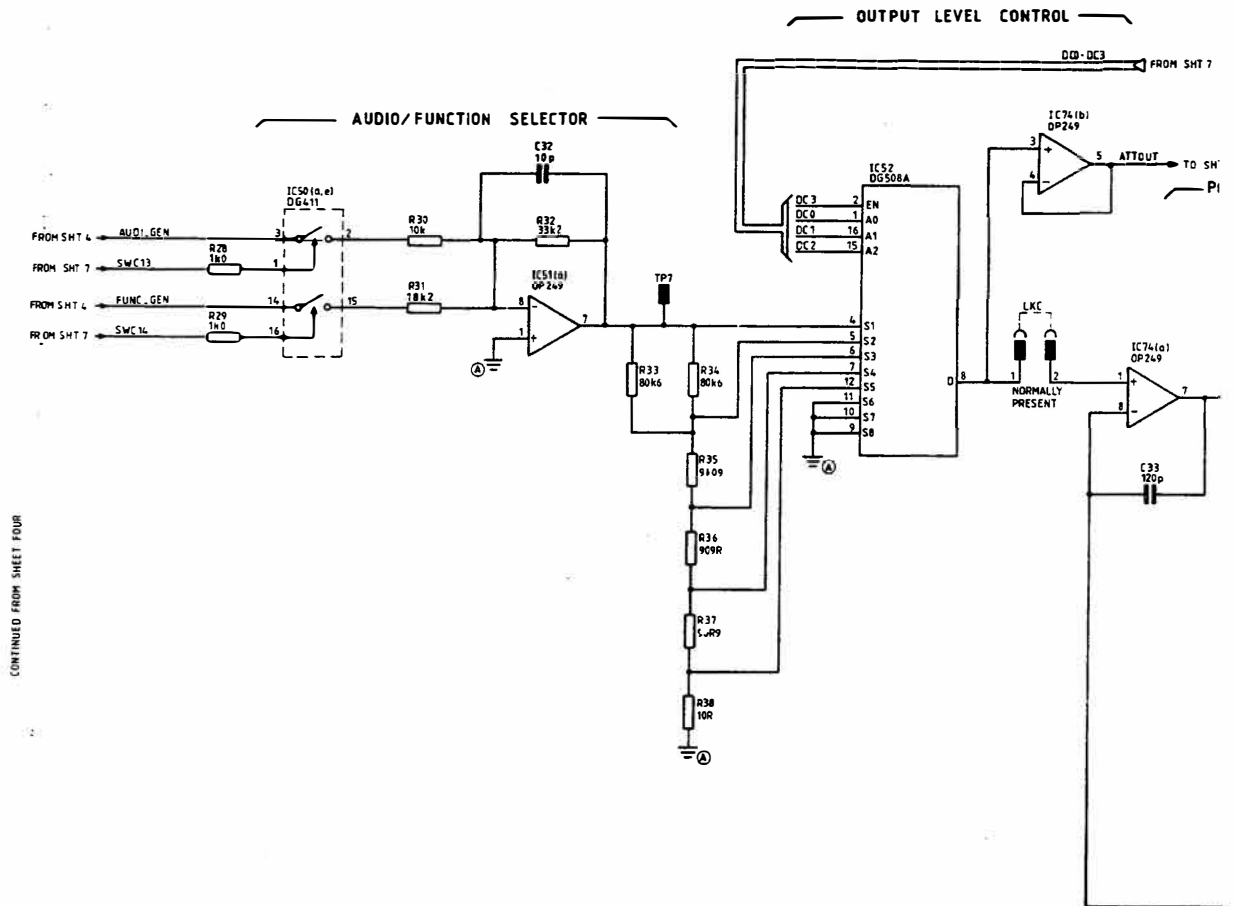
Circuit diagrams **A1**

Fig. 7-24 A1 DACs and analogue filters - circuit

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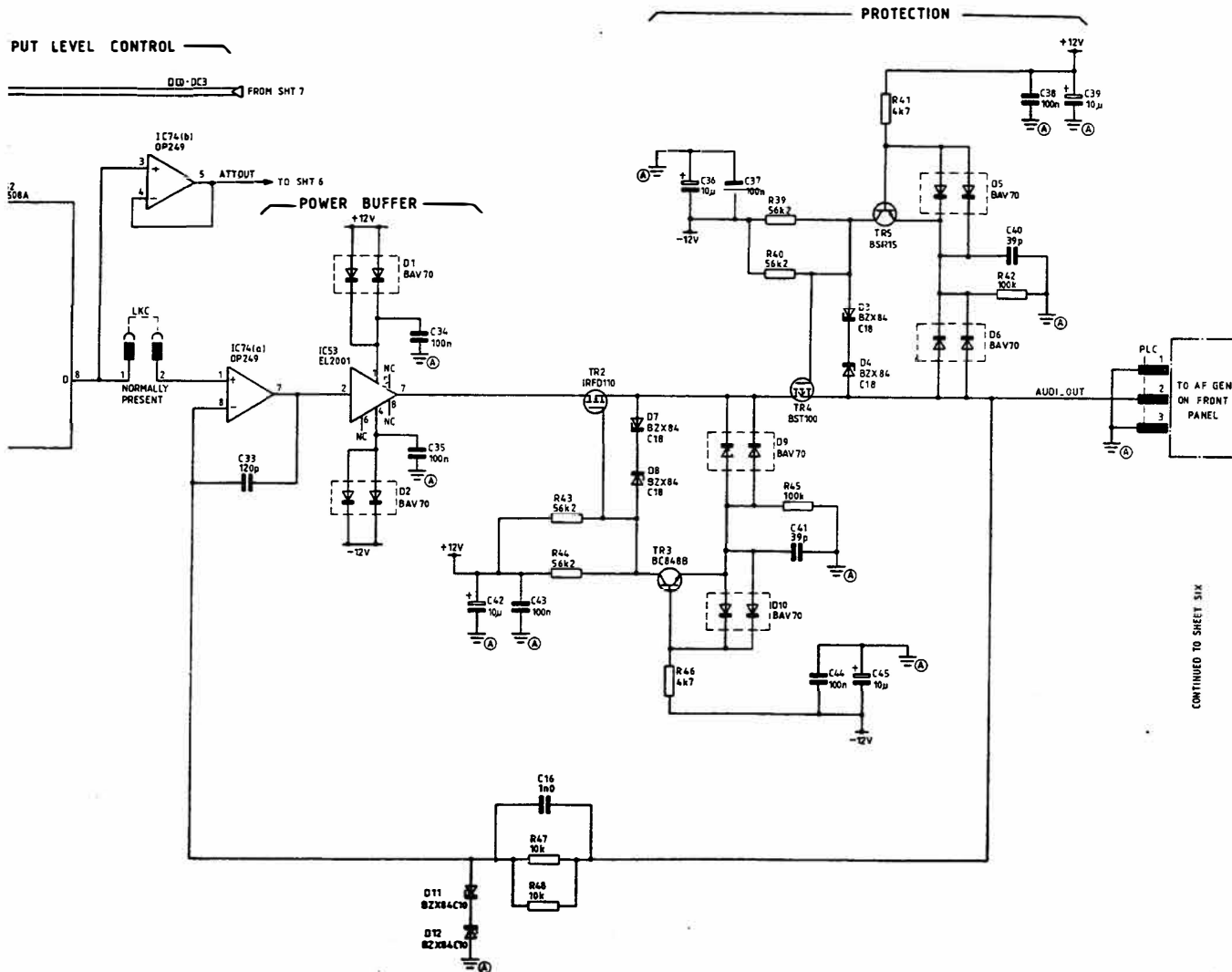
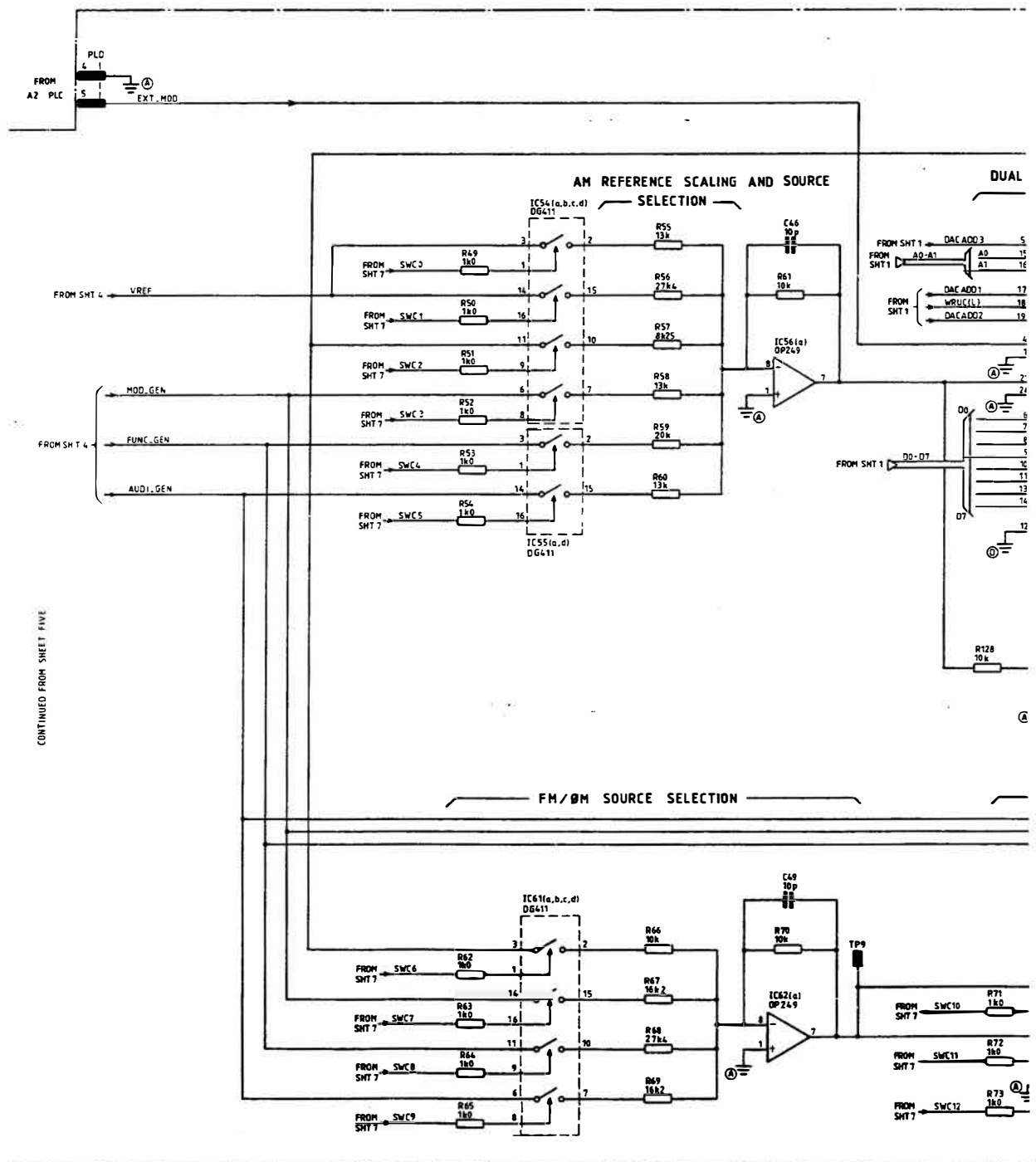
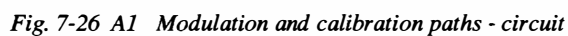
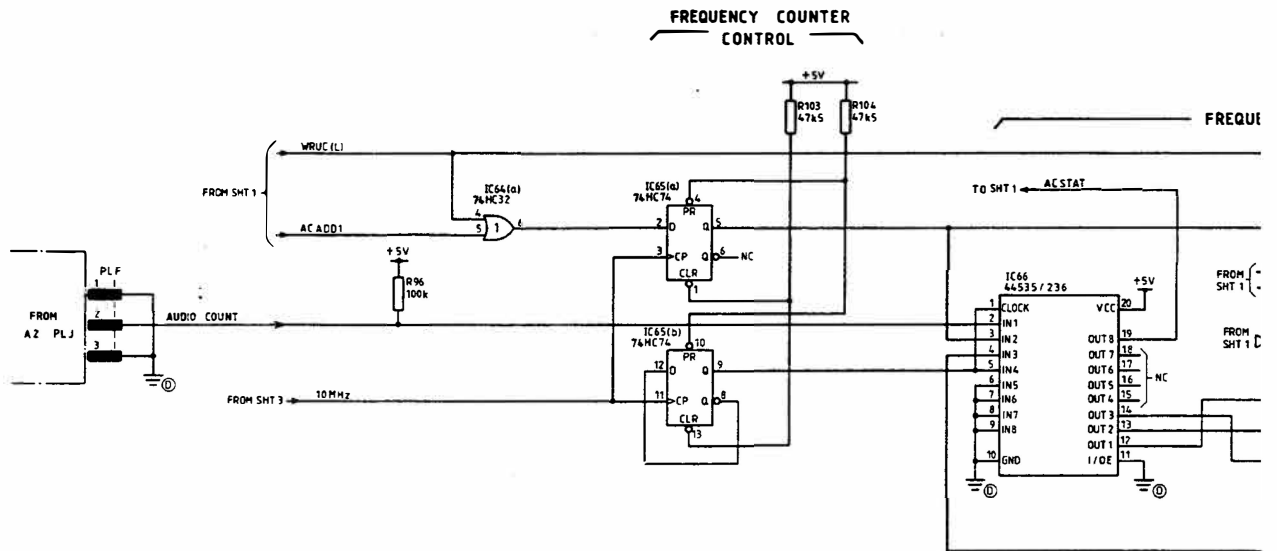
Circuit diagrams **A1**

Fig. 7-25 A1 Audio output path - circuit

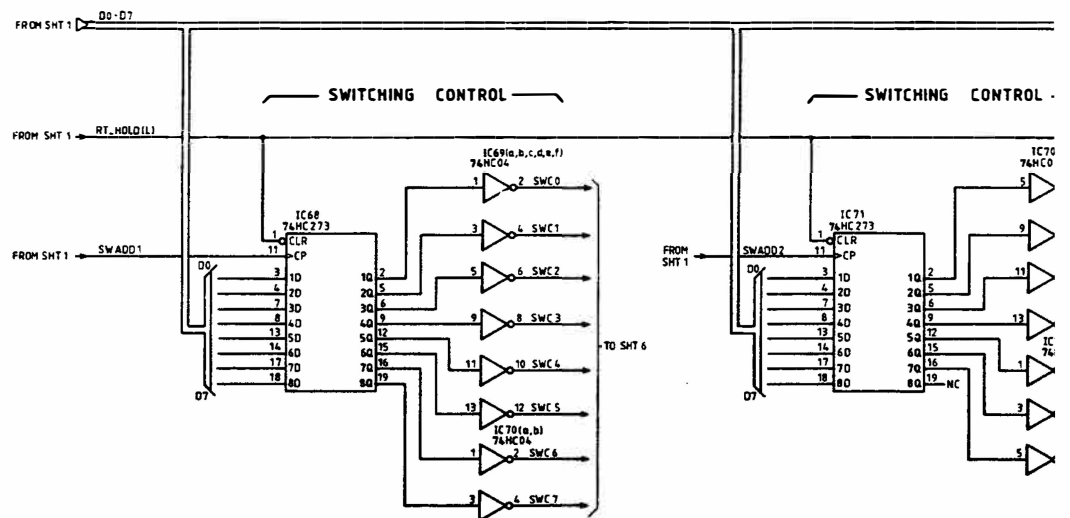




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CONTINUED FROM SHEET SIX





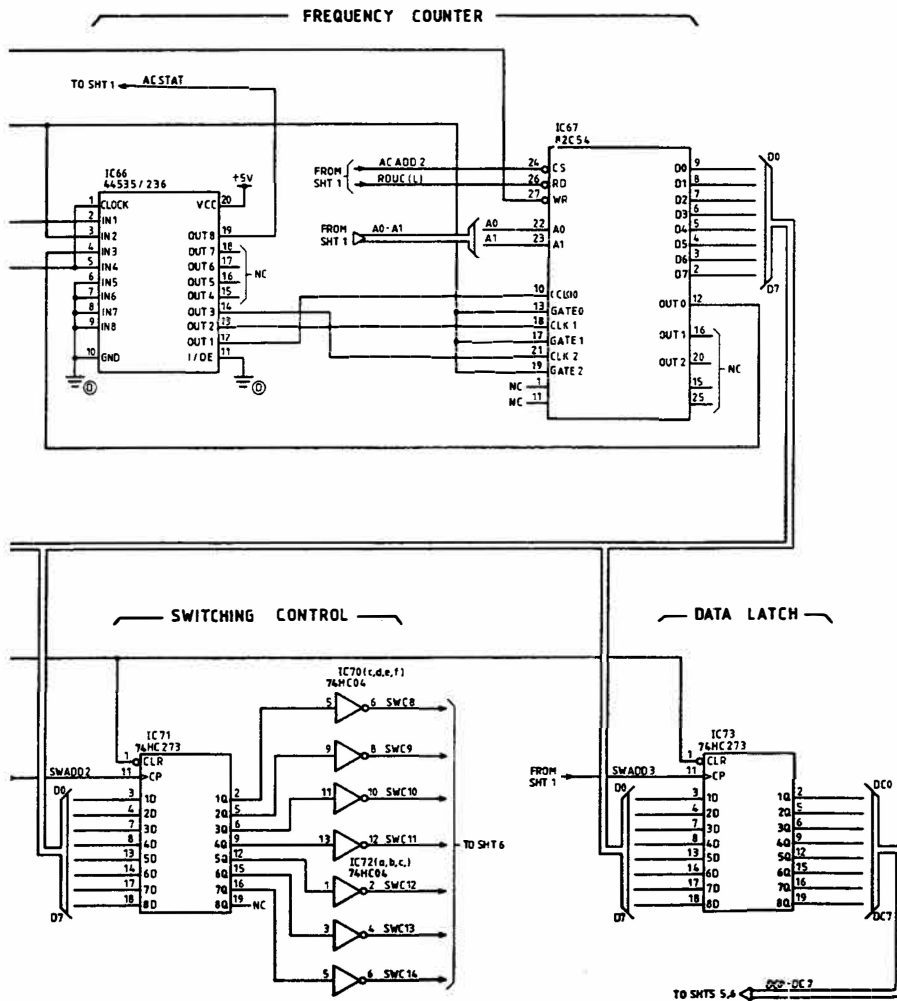
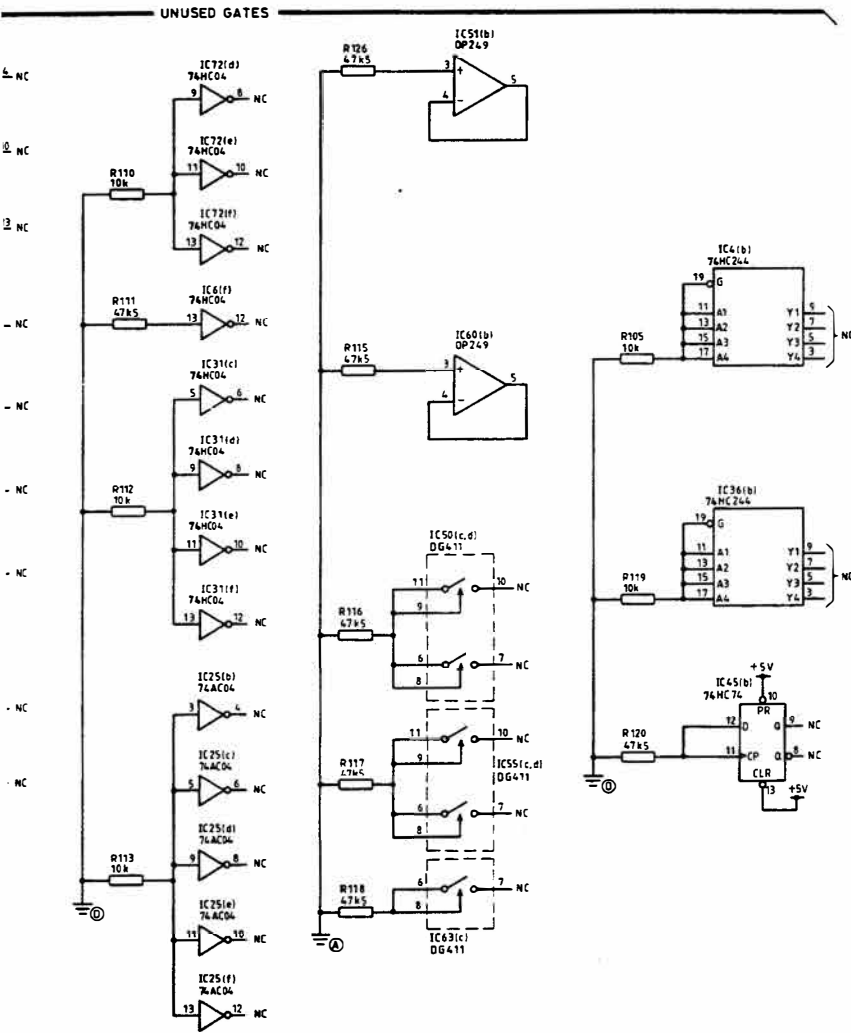
Circuit diagrams **A1**

Fig. 7-27 A1 Audio counter and switch control - circuit



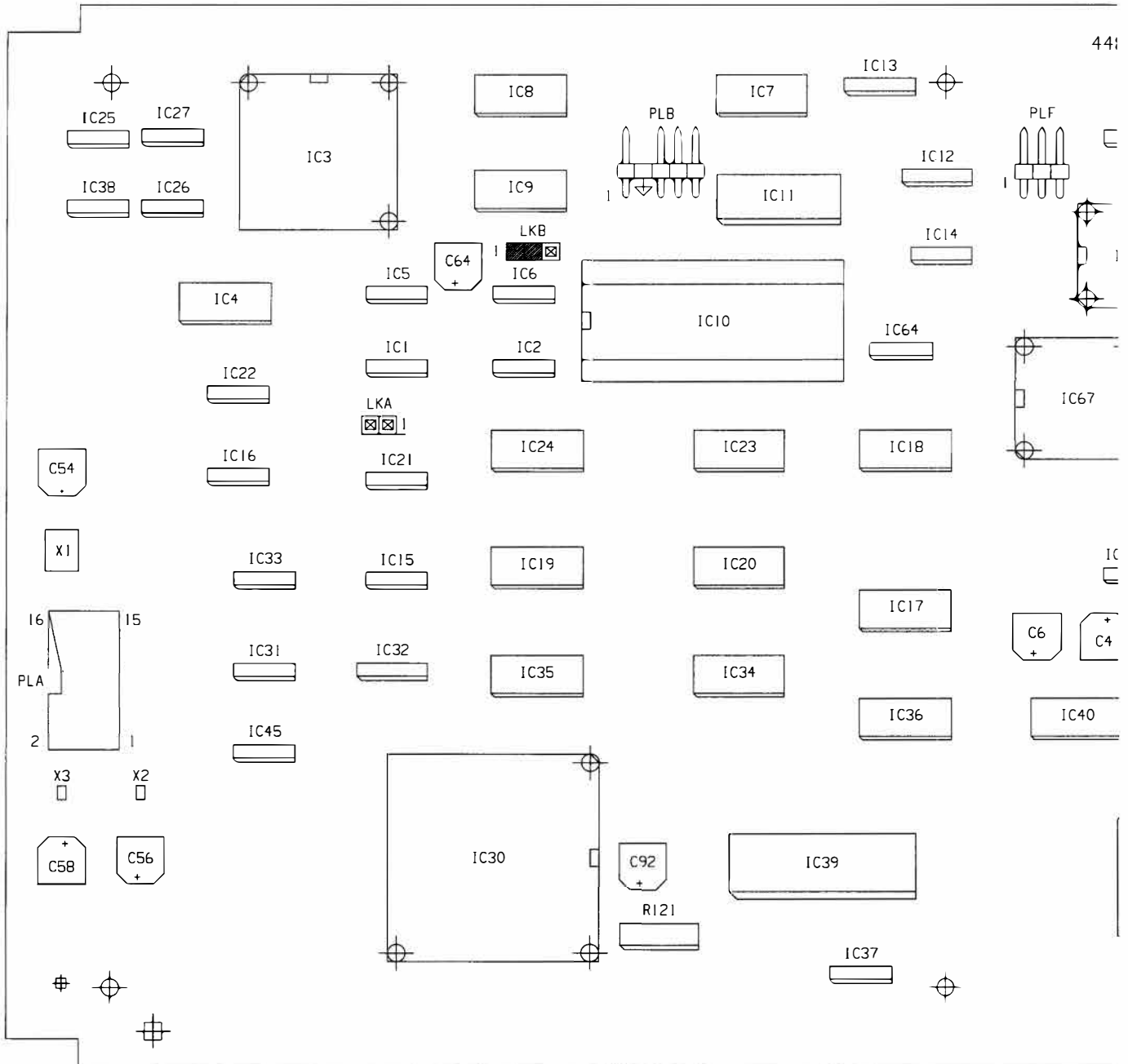
Circuit diagrams **A1**



SUPPLY LINE TABLE									
IC	+12V	+5V	+5VA	GND A	GND D	-5V	-12V	DEC	CAP
1		14			7			C61	10n
2		14			7			C62	10n
3		44			22			C63	47n
4		20			10			C64	100μ
5		14			7			C65	10n
6		14			7			C66	10n
7		20			10			C67	10n
8		20			10			C68	10n
9		20			10			C69	10n
10		28			14			C70	10n
11		28			14			C71	10n
12		16			8			C72	10n
13		16			8			C73	10n
14		14			7			C74	10n
15		14			7			C75	10n
16		14			7			C76	10n
17		20			10			C77	10n
18		20			10			C78	10n
19		20			10			C79	10n
20		20			10			C80	10n
21		14			7			C81	10n
22		14			7			C82	10n
23		20			10			C83	10n
24		20			10			C84	10n
25		14			7			C85	10n
26		14			7			C86	10n
27		14			7			C87	10n
30		16,26			2,10			C88	10n
31		14			7			C89	10n
32		16			8			C90	10n
33		14			7			C91	10n
34		20			10			C92	10n
35		20			10			C93	10n
36		20			10			C94	10n
37		14			7			C95	10n
38		14			7			C96	10n
39		22			8,21			C97	10n
41	6						2	C98	10n
42	6						2	C99	10n
44	7						4	C100	10n
45		14			7			C101	10n
50	13		12	5			4	C102	10n
51	6						2	C103	10n
52	13		14				3	C104	10n
54	13		12	5			4	C105	10n
55	13		12	5			4	C106	10n
56	6						2	C107	10n
58	6						2	C108	10n
59	13		14				3	C109	10n
60	6						2	C110	10n
61	13		12	5			4	C111	10n
62	6						2	C112	10n
63	13		12	5			4	C113	10n
64		14			7			C114	10n
65		14			7			C115	10n
67		28			14			C116	10n
68		20			10			C117	10n
69		14			7			C118	10n
70		14			7			C119	10n
71		20			10			C120	10n
72		14			7			C121	10n
73		20			10			C122	10n
74	6						2	C123	10n

ALL IC'S DECOUPLED AT SUPPLY TO GROUND AS INDICATED

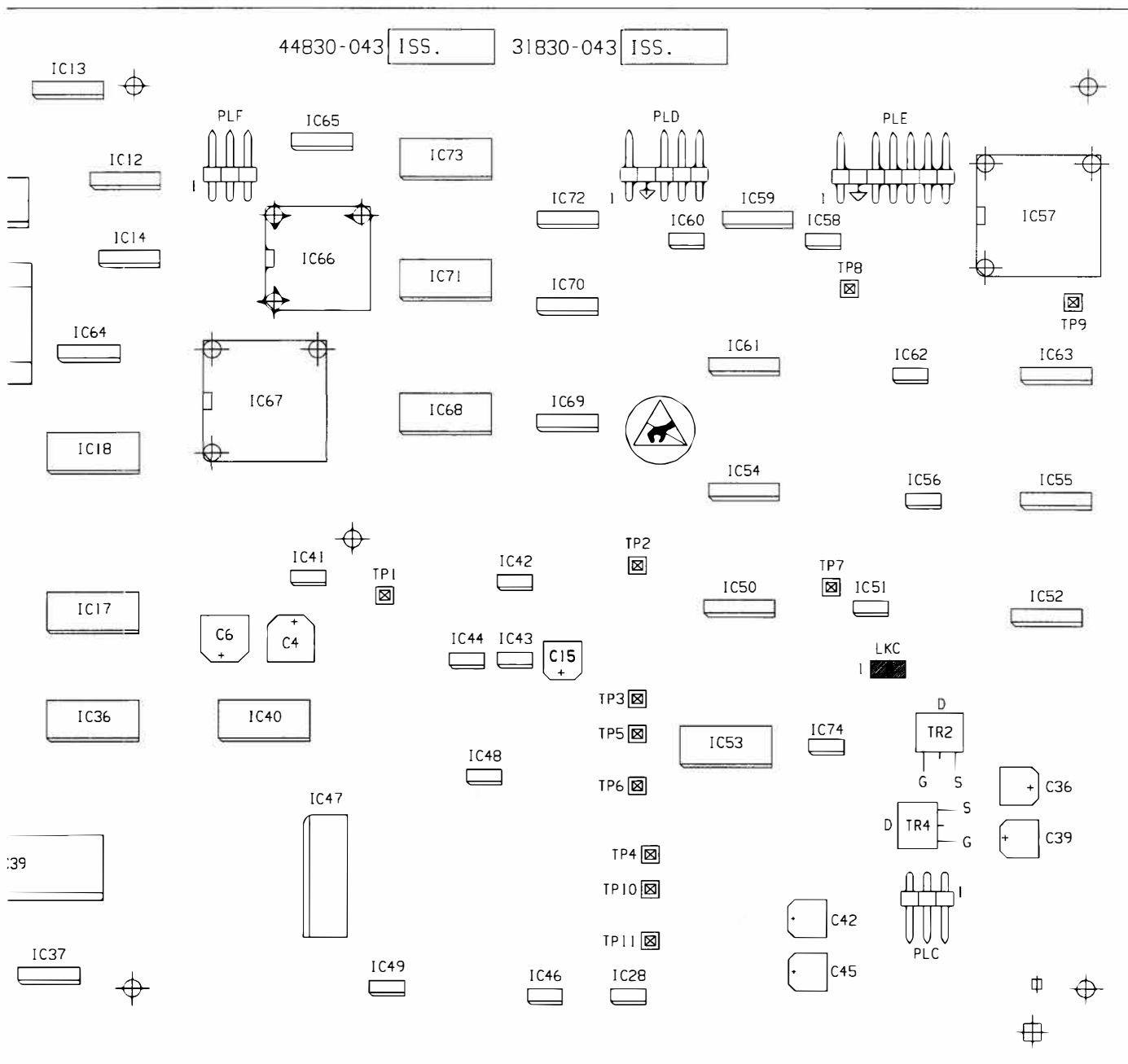
Fig. 7-28 A1 Power supplies - circuit

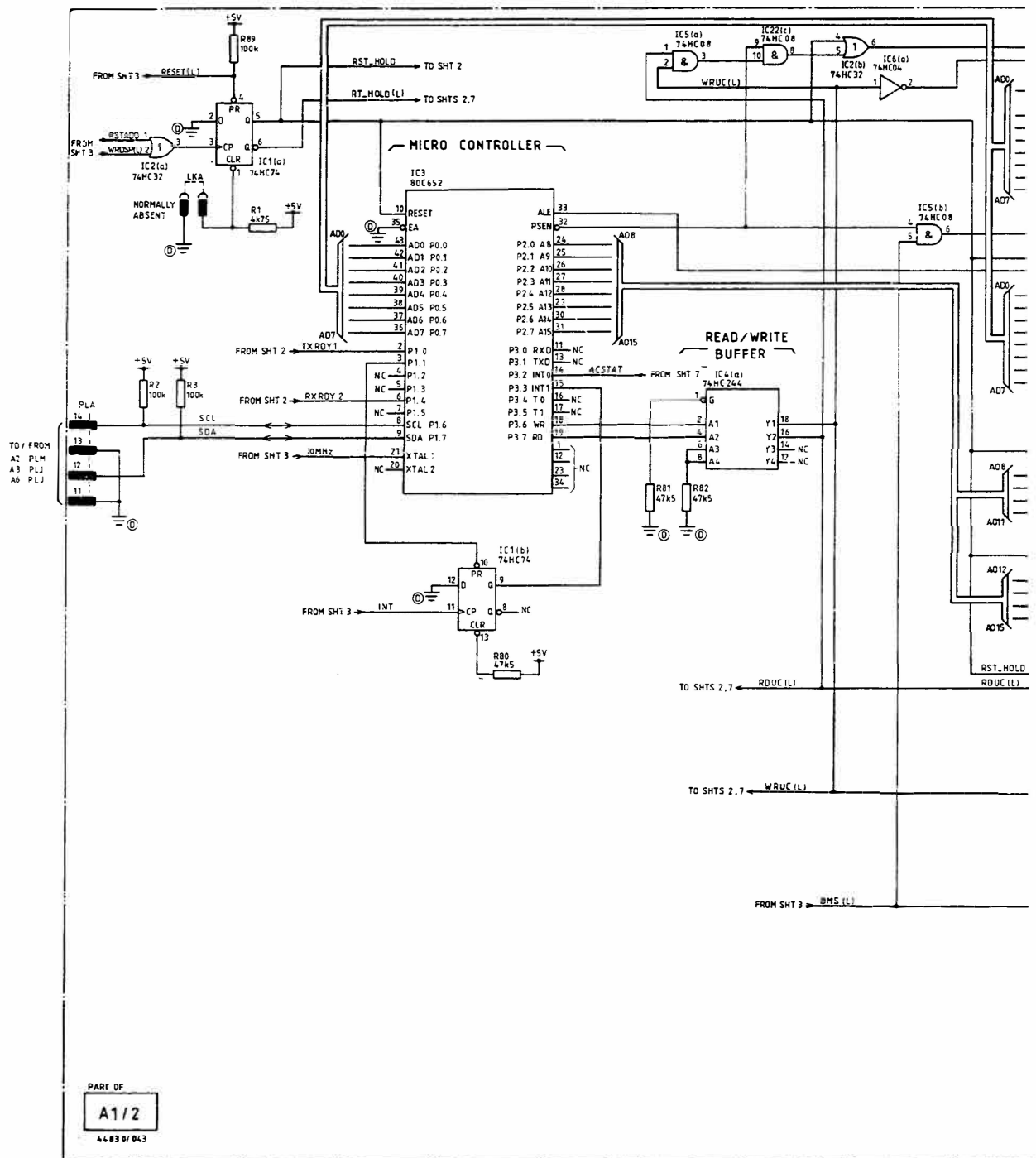


**Power supplies A1**

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# Component layout A1/2





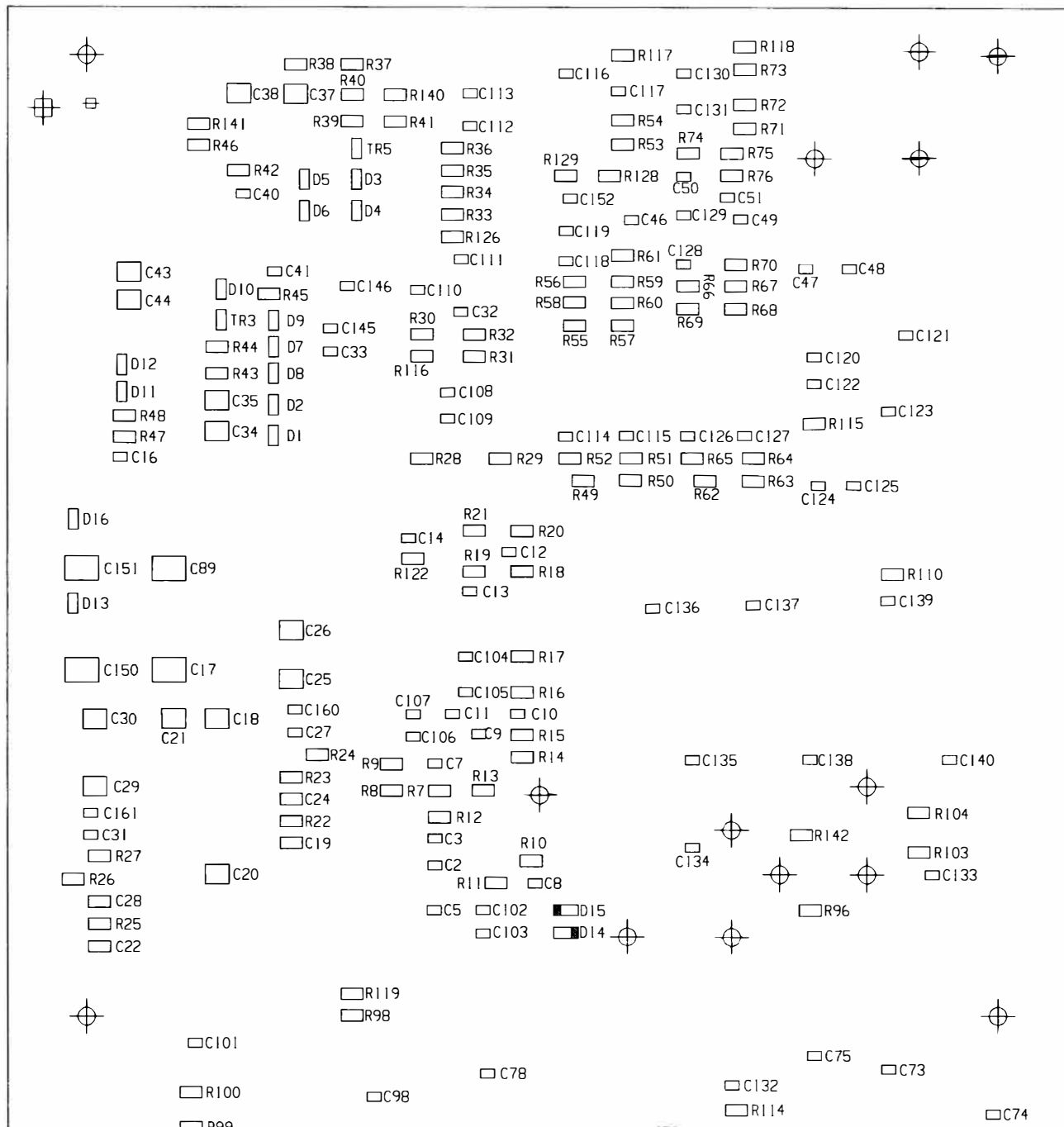


7-49

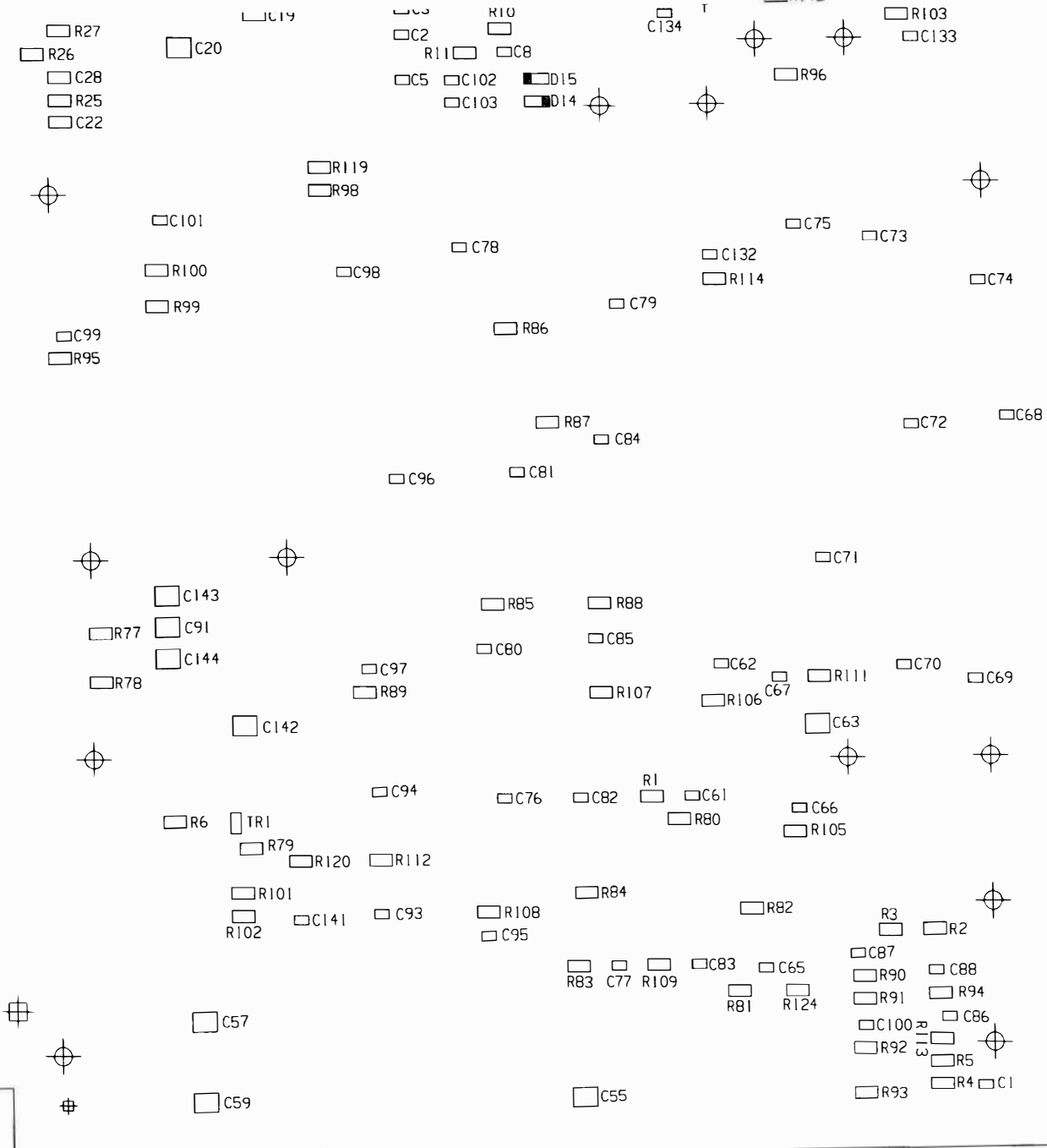
## Microprocessor memory and addressing A1/2

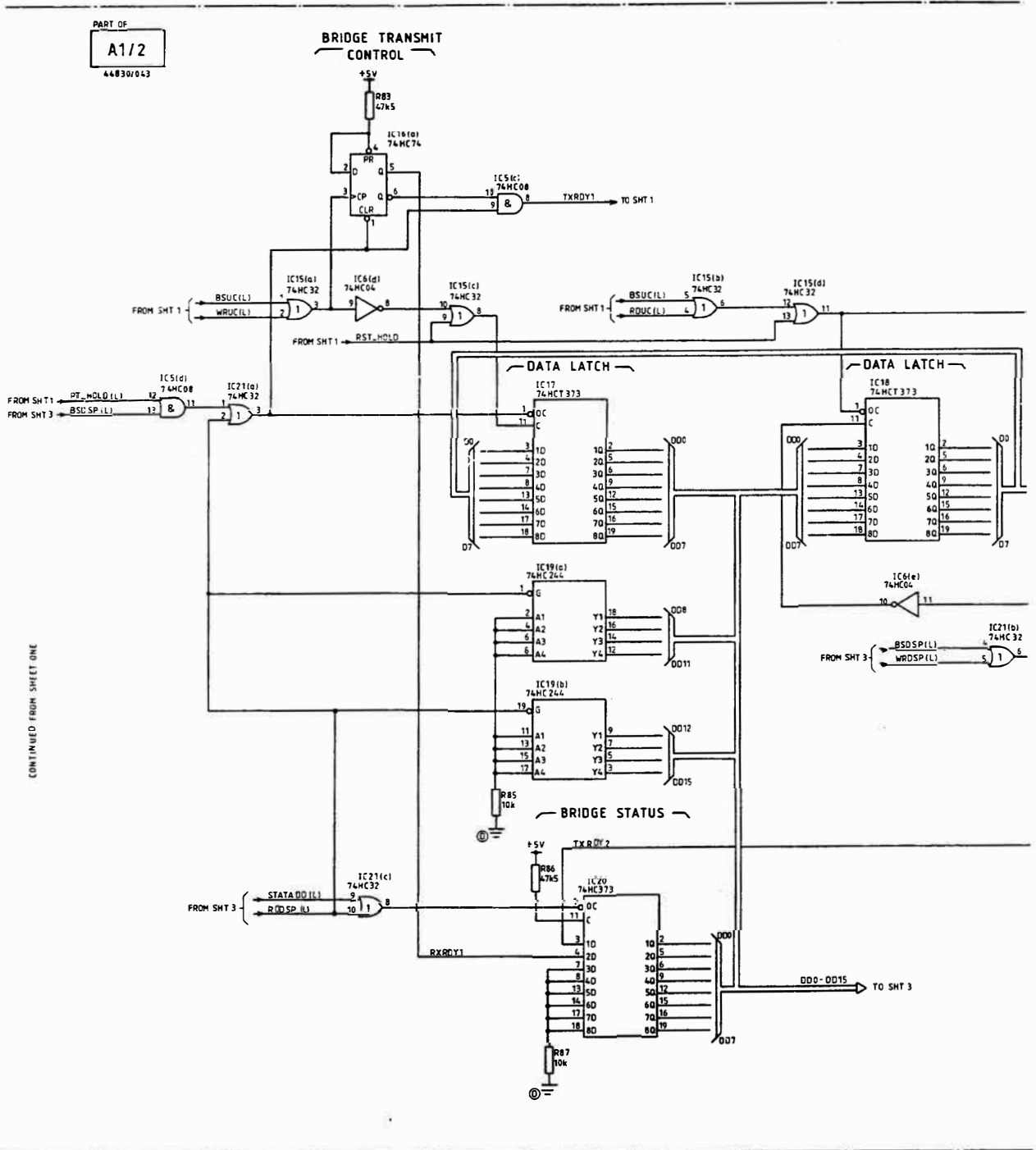
Dwg. No. 44830/043

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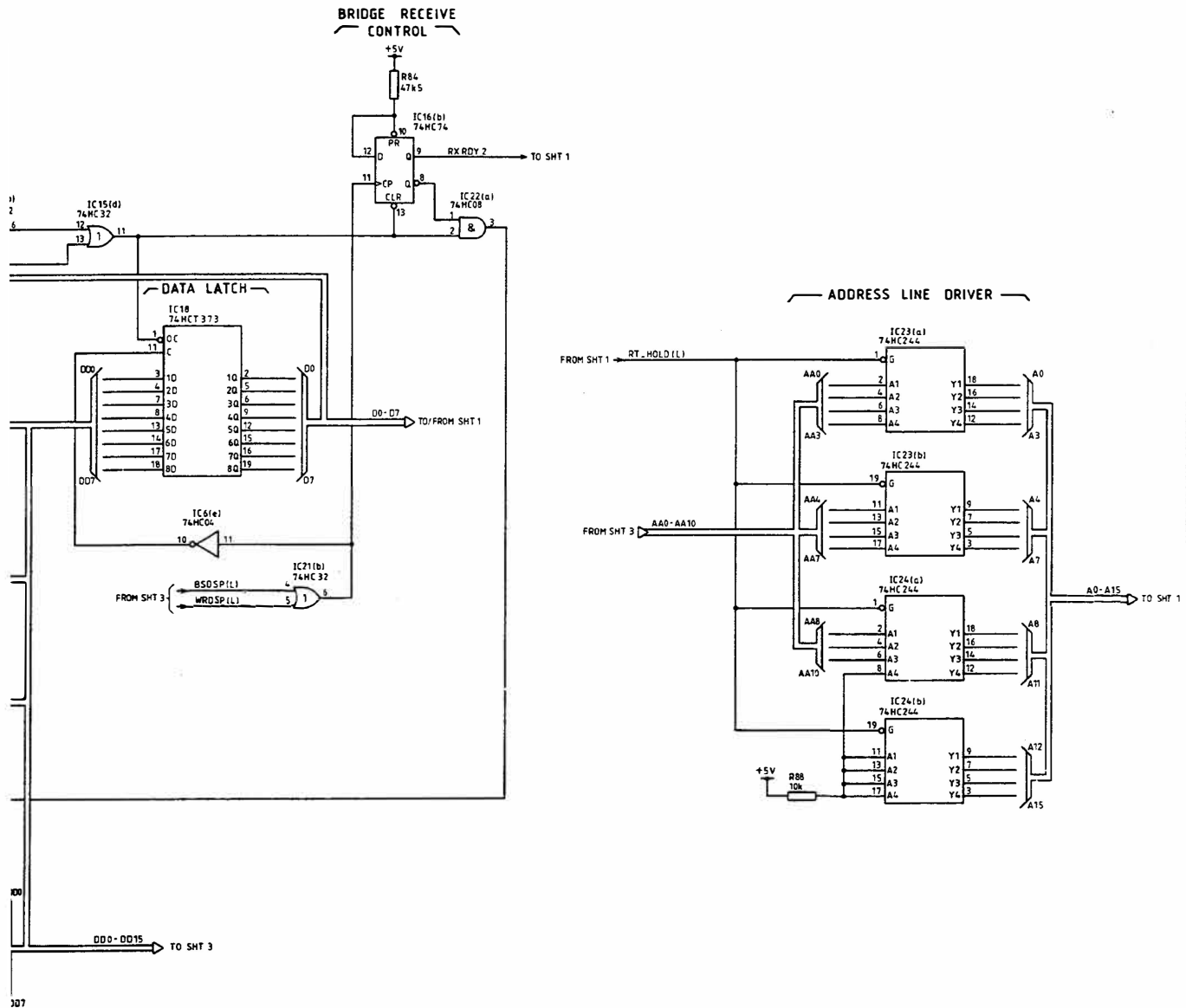
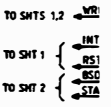
Circuit diagrams **A1/2**

Fig. 7-32 A1/2 Bridge and boot addressing - circuit



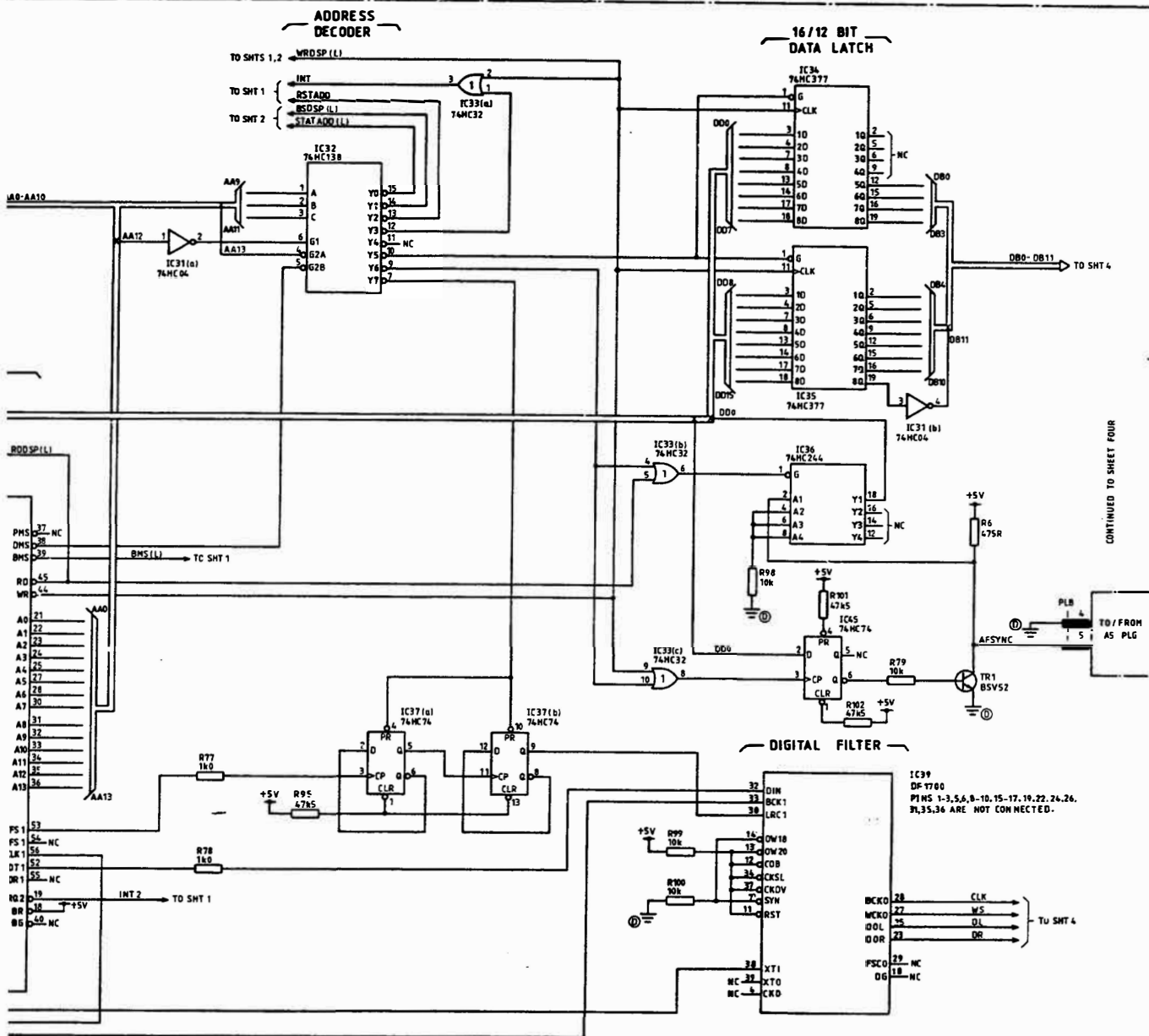
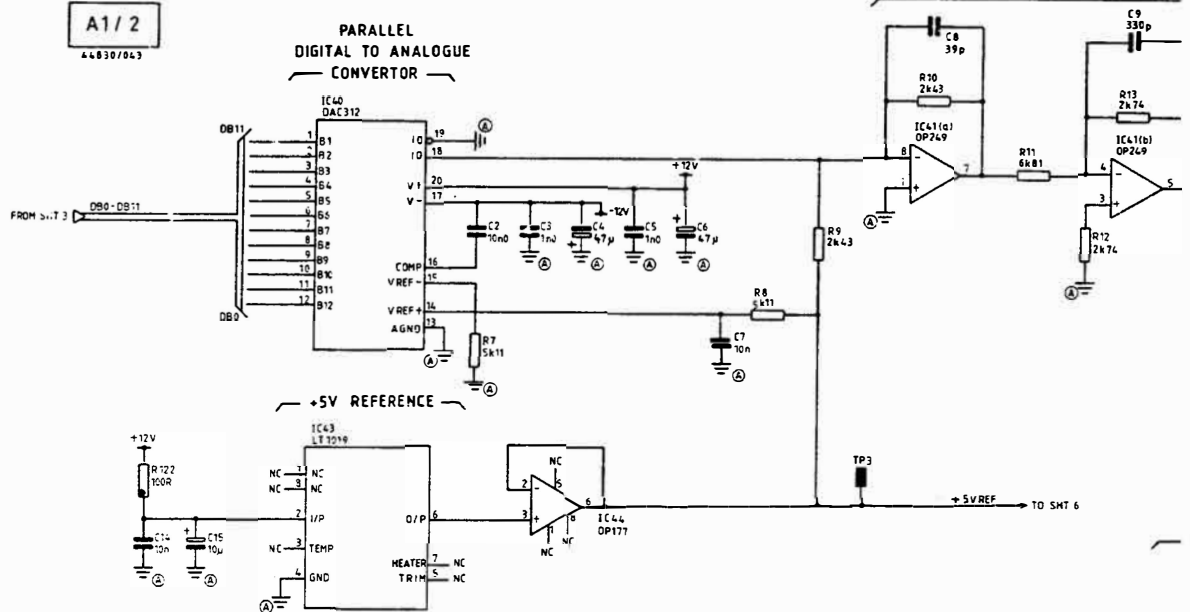
Circuit diagrams **A1/2**

Fig. 7-33 A1/2 DSP, dividers, and oversampling - circuit

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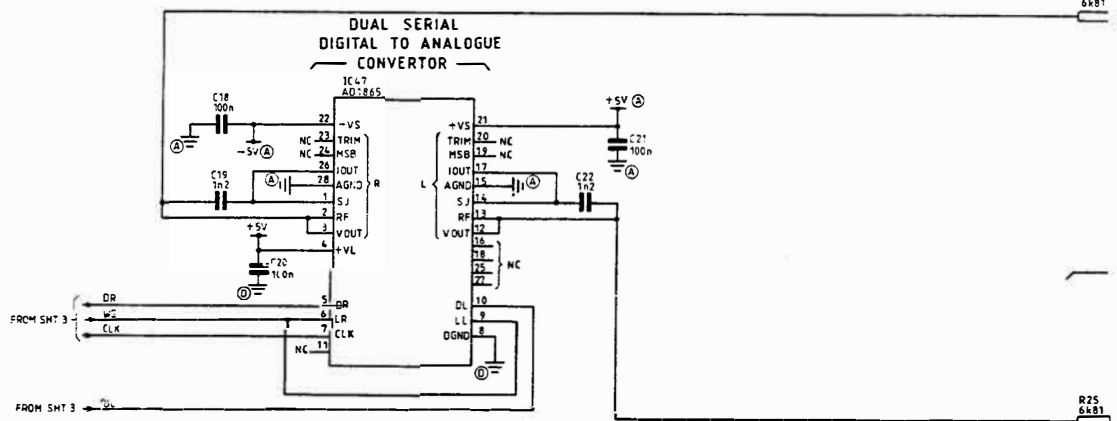
# PARALLEL DIGITAL TO ANALOGUE CONVERTOR

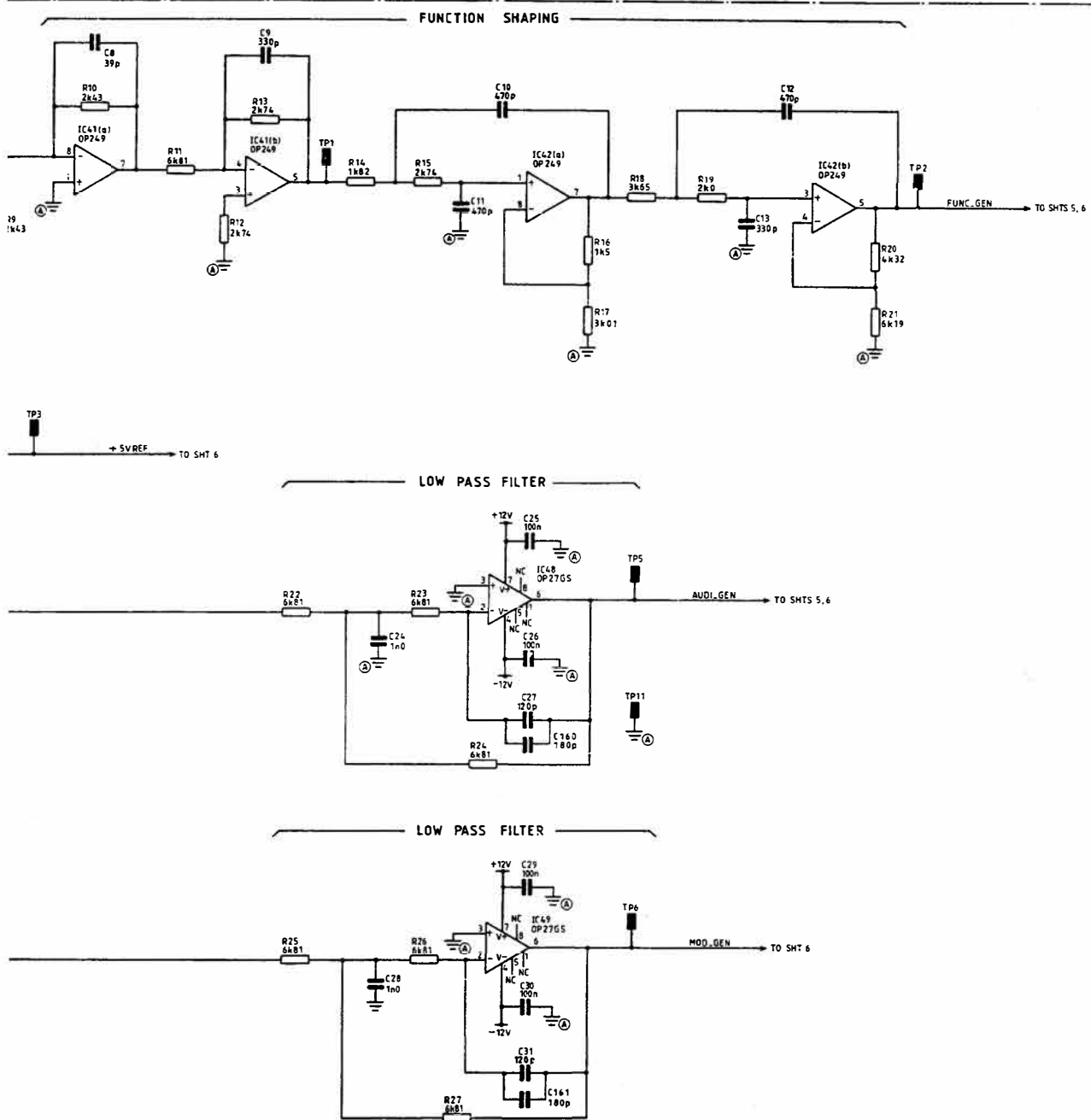


## +5V REFERENCE

CONTINUED FROM SHEET THREE

# DUAL SERIAL DIGITAL TO ANALOGUE CONVERTOR

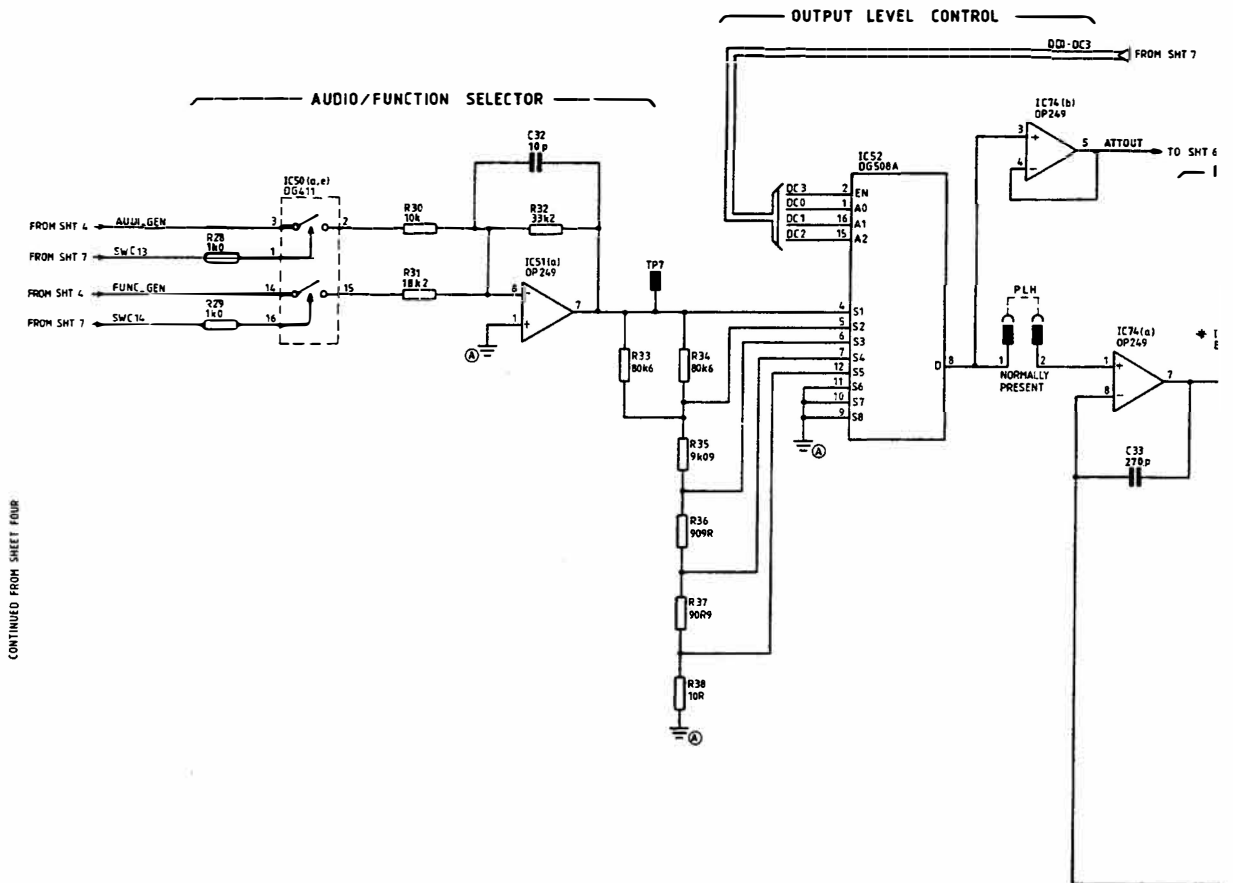


Circuit diagrams **A1/2**

CONTINUED TO SHEET FIVE

Fig. 7-34 A1/2 DACs and analogue filters - circuit

PART OF  
A1/2  
44830/043



CONTINUED FROM SHEET FOUR



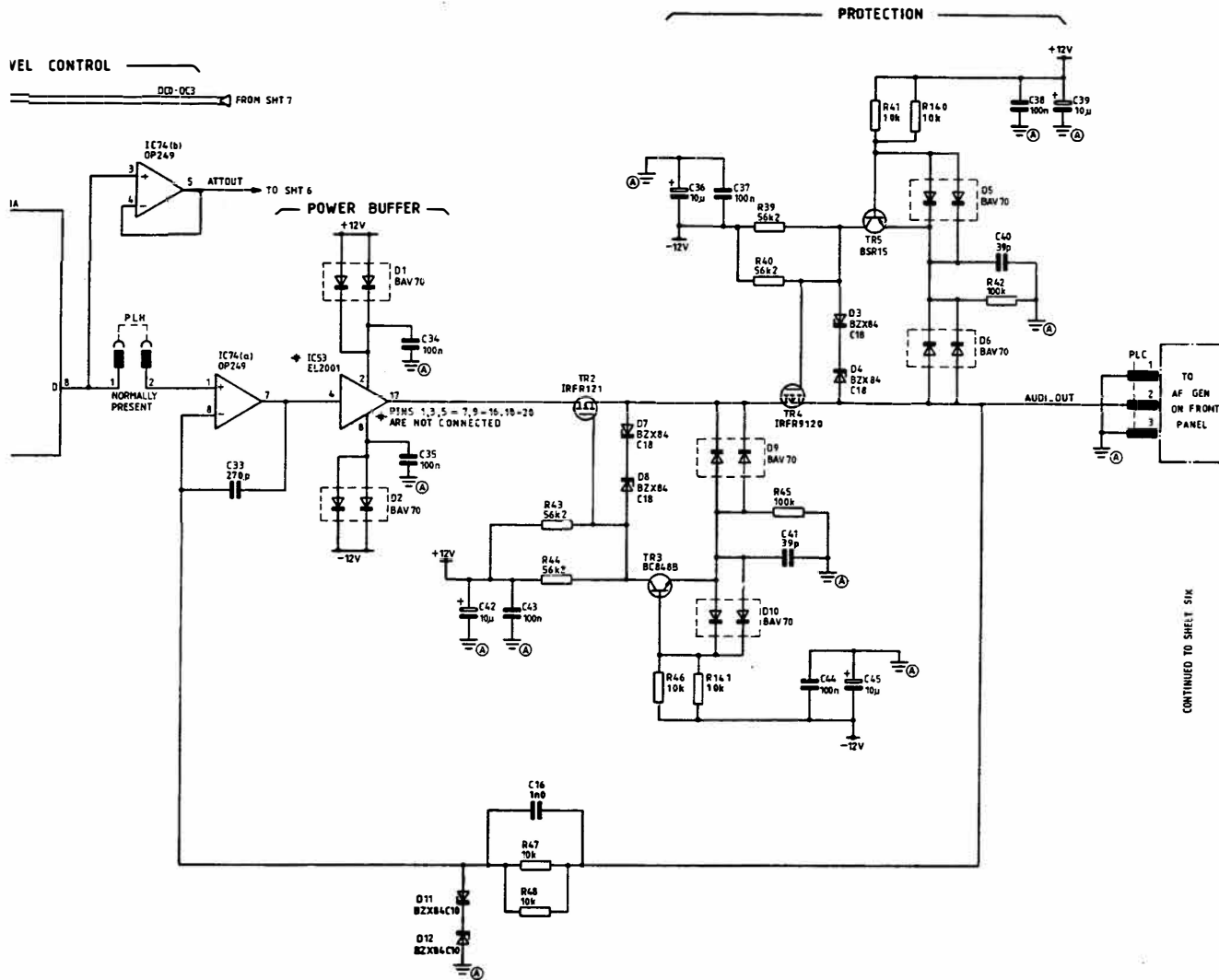
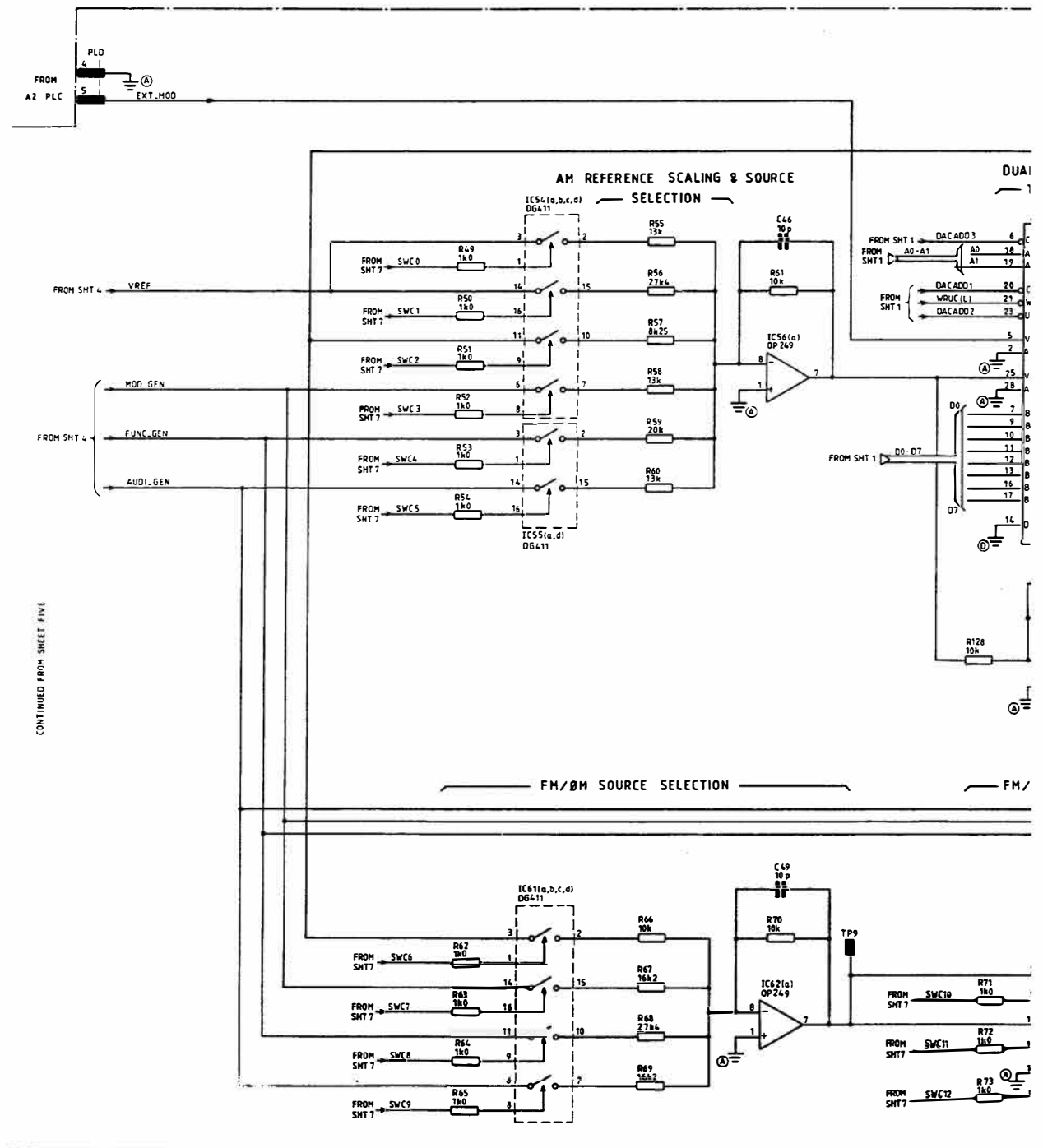
Circuit diagrams **A1/2**

Fig. 7-35 A1/2 Audio output path - circuit



Circuit diagrams **A1/2**

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**A1/2**  
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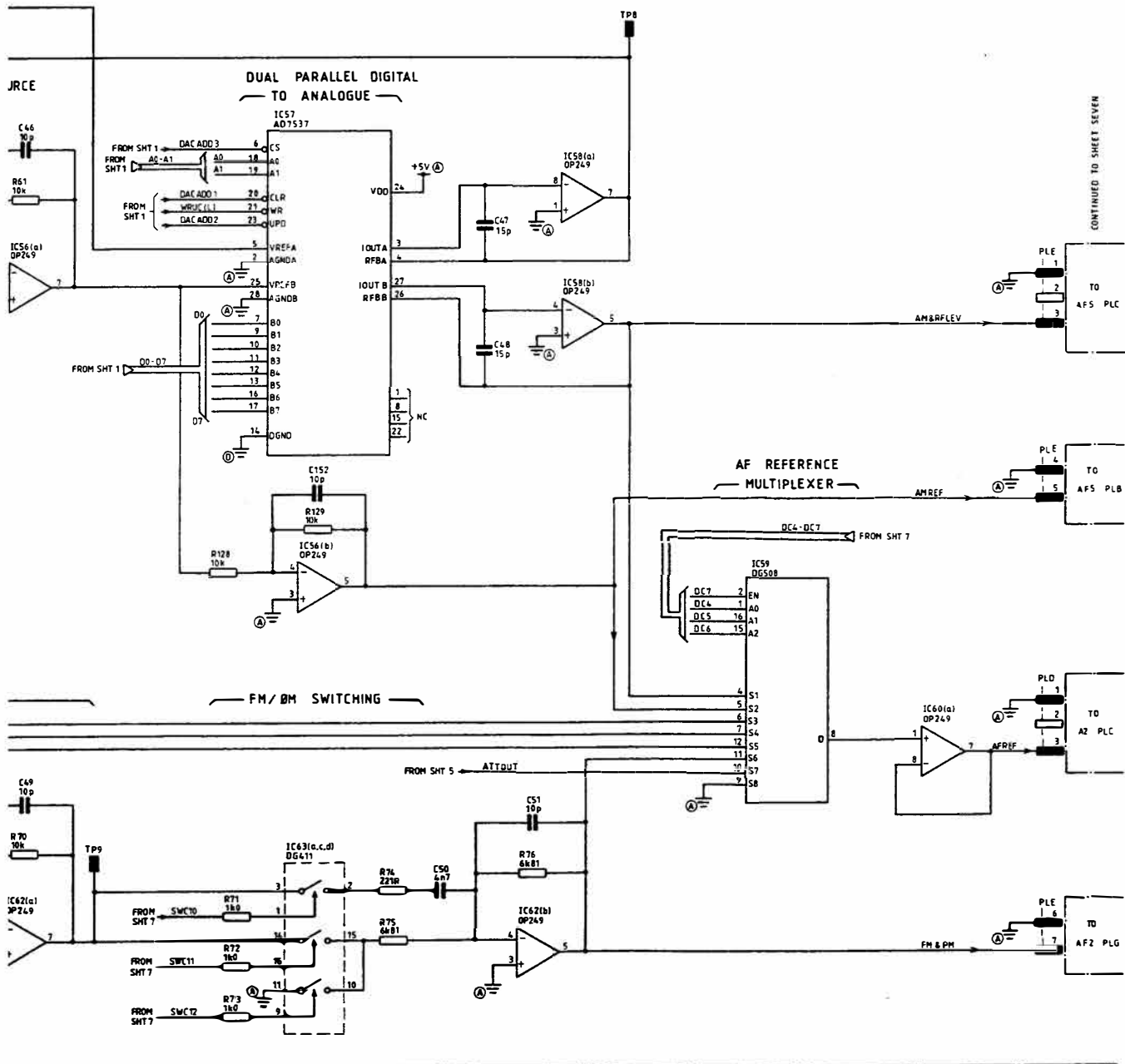
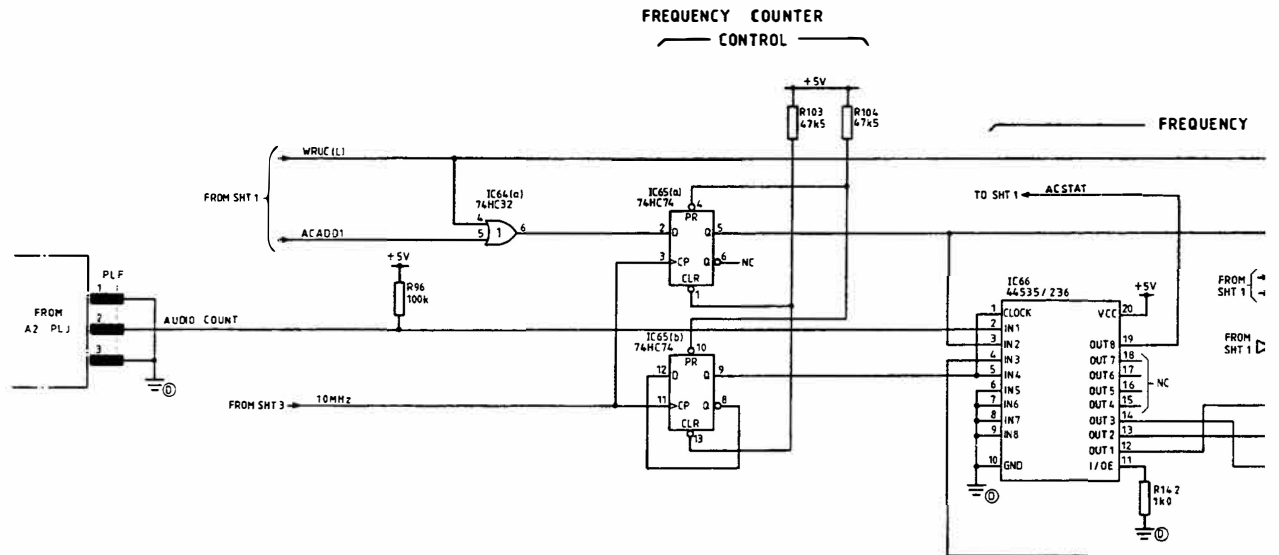
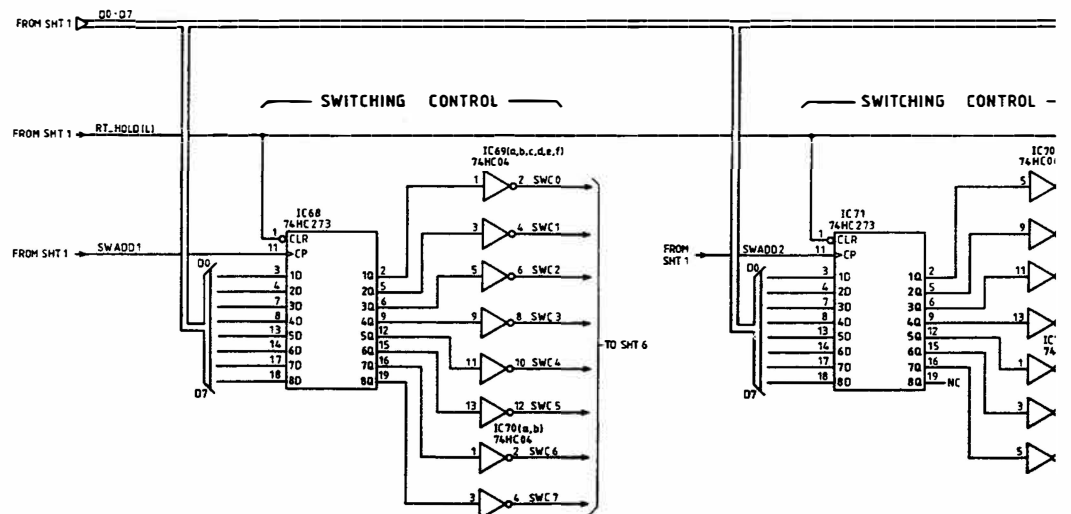


Fig. 7-36 A1/2 Modulation and calibration paths - circuit

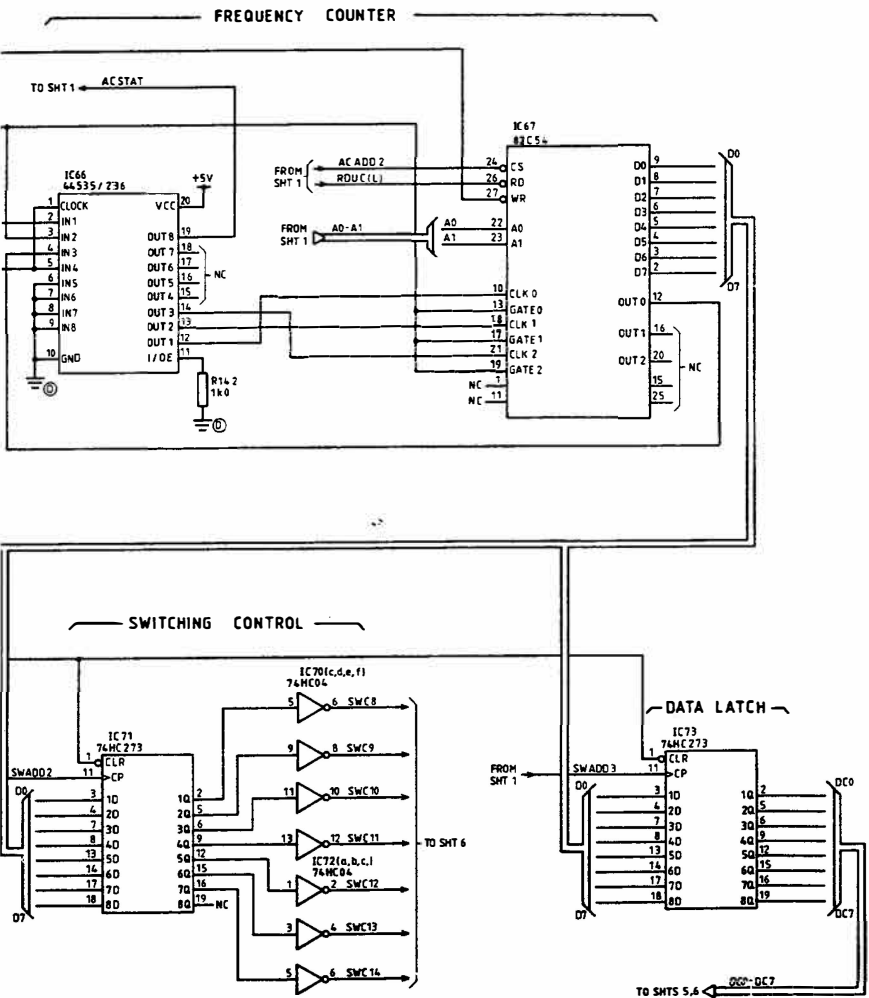
PART OF  
A1/2  
44830/043



CONTINUED FROM SHEET SIX

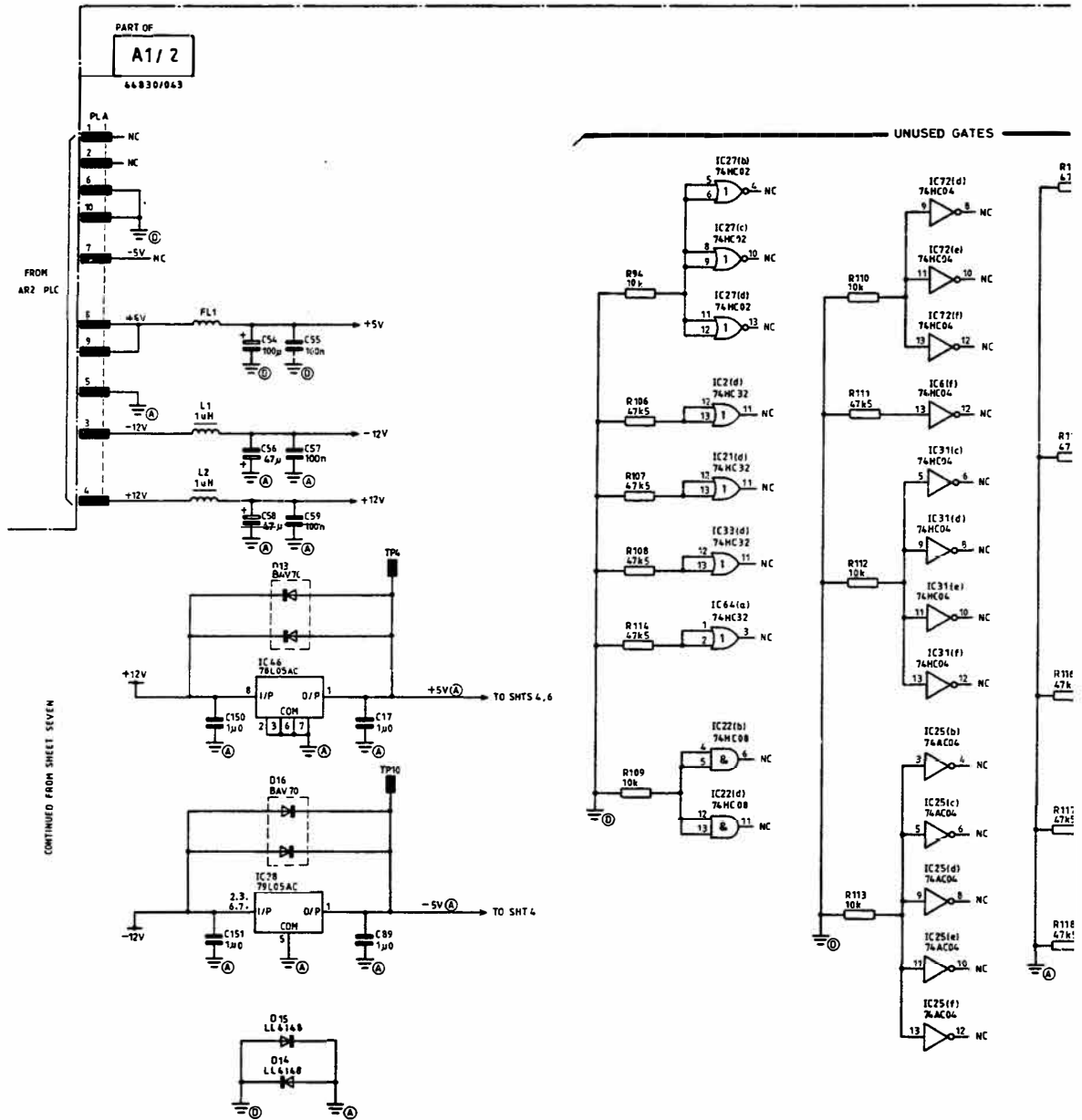


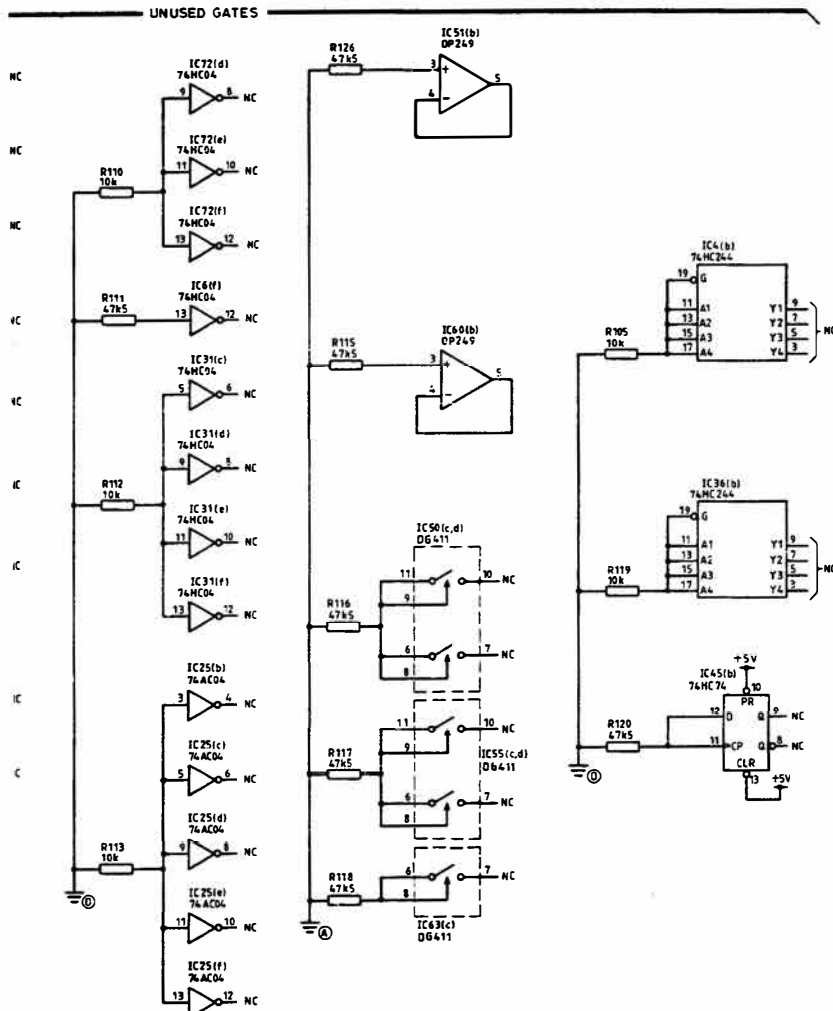
# Circuit diagrams A1/2



CONTINUED TO SHEET EIGHT

Fig. 7-37 A1/2 Audio counter and switch control - circuit

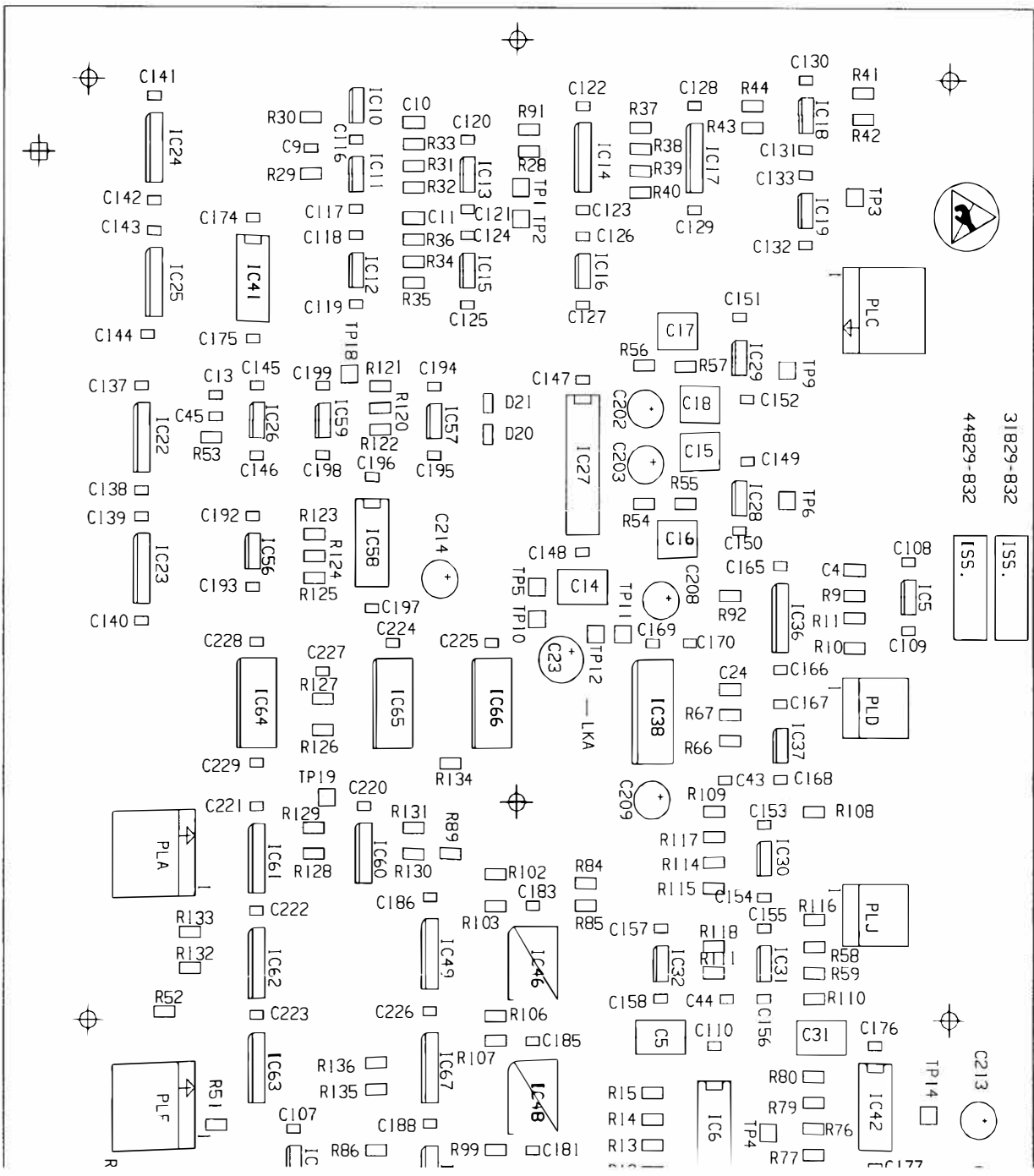


Circuit diagrams **A1/2**

SUPPLY LINE TABLE									
IC	+12V	+5V	+5VA	GND A	GND D	-5V	-12V	DEC	CAP
1	14				7			C61	10n
2	14				7			C62	10n
3	44				22			C63	47n
4	20				10			C64	100μ
5	14				7			C65	10n
6	14				7			C66	10n
7	20				10			C67	10n
8	20				10			C68	10n
9	20				10			C69	10n
10	28				14			C70	10n
11	28				14			C71	10n
12	16				8			C72	10n
13	16				8			C73	10n
14	14				7			C74	10n
15	14				7			C75	10n
16	14				7			C76	10n
17	20				10			C77	10n
18	20				10			C78	10n
19	20				10			C79	10n
20	20				10			C80	10n
21	14				7			C81	10n
22	14				7			C82	10n
23	20				10			C83	10n
24	20				10			C84	10n
25	14				7			C85	10n
26	14				7			C86	10n
27	14				7			C87	10n
28	16,26				2,10			C88	10n
29	57				29,49			C89	47n
30								C90	47n
31	14				7			C91	47n
32	16				8			C92	100μ
33	14				7			C93	10n
34	20				10			C94	10n
35	20				10			C95	10n
36	20				10			C96	10n
37	14				7			C97	10n
38	14				7			C98	10n
39	21				4,9,20			C99	10n
40								C100	10n
41	6							C101	10n
42	6							C102	10n
43	6							C103	10n
44	7							C104	10n
45	14				7			C105	10n
46								C106	10n
47								C107	10n
48								C108	10n
49	13				5			C109	10n
50								C110	10n
51	6							C111	10n
52	13				14			C112	10n
53								C113	10n
54	13				5			C114	10n
55	13				5			C115	10n
56								C116	10n
57								C117	10n
58	6							C118	10n
59	6							C119	10n
60	13				14			C120	10n
61								C121	10n
62								C122	10n
63	13				5			C123	10n
64								C124	10n
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67	28				14			C127	10n
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69	14				7			C129	10n
70	14				7			C130	10n
71	20				10			C131	10n
72	14				7			C132	10n
73	20				10			C133	10n
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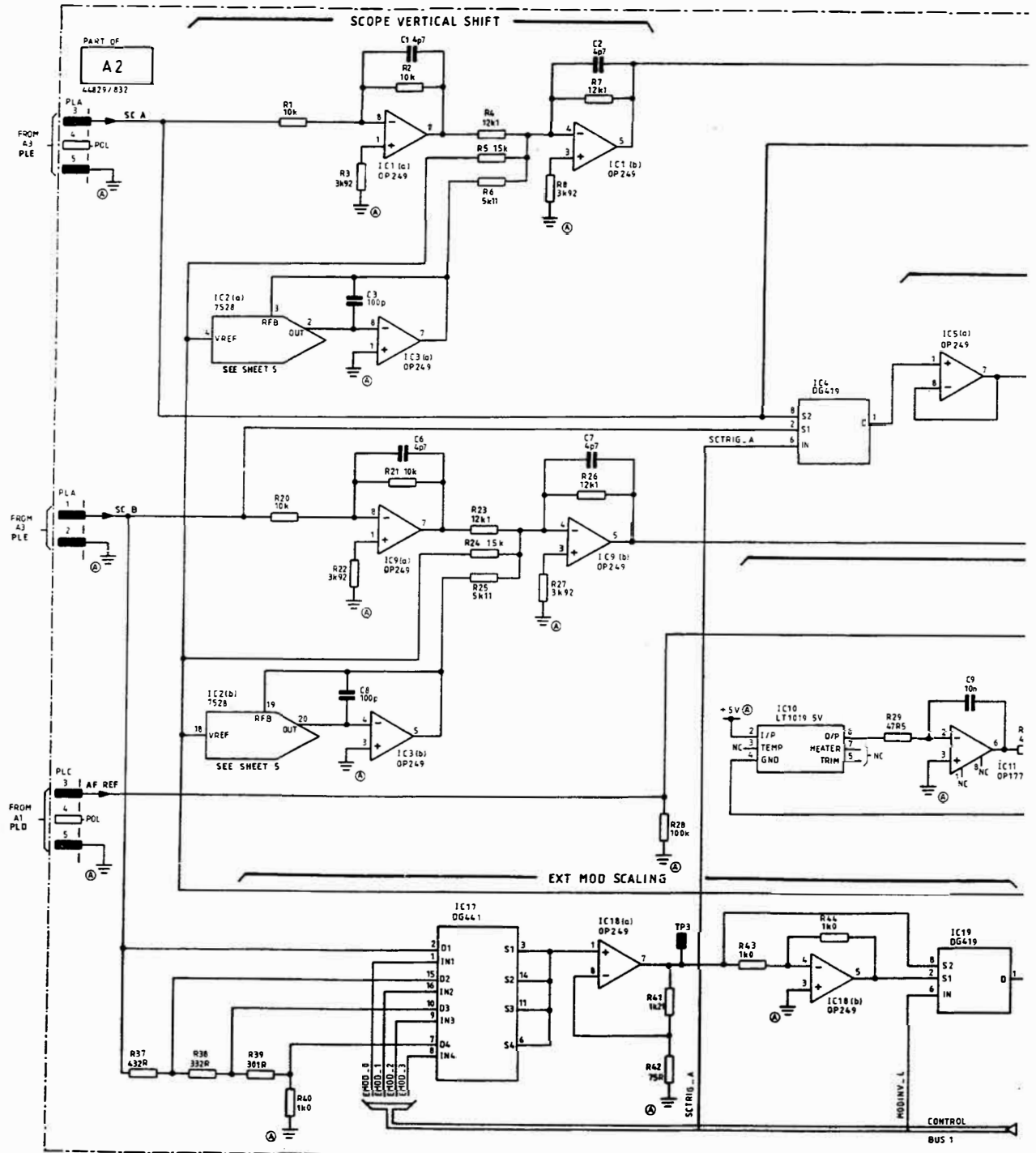
ALL IC'S DECOUPLED AT SUPPLY TO GROUND AS INDICATED

Fig. 7-38 A1/2 Power supplies - circuit









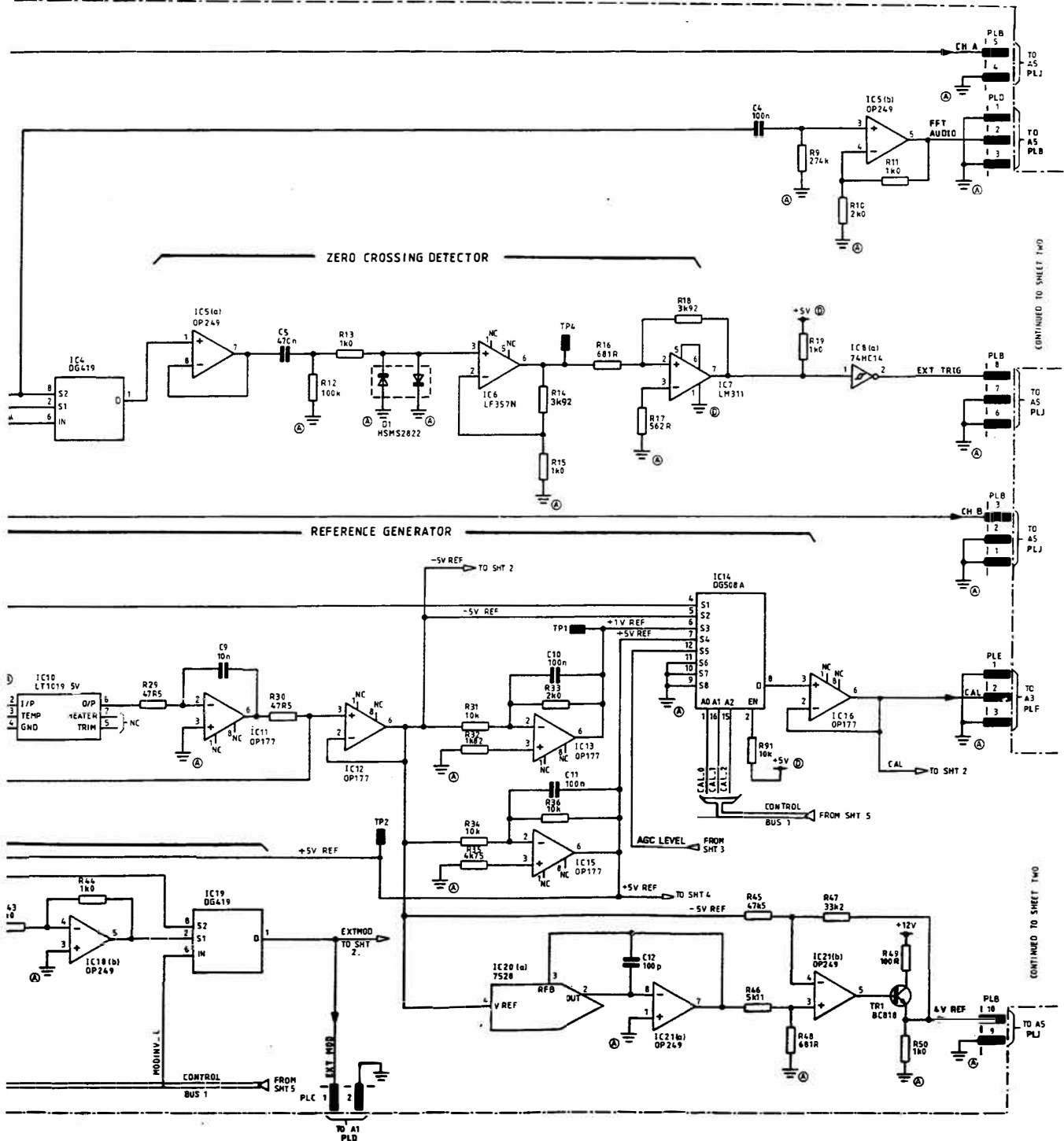
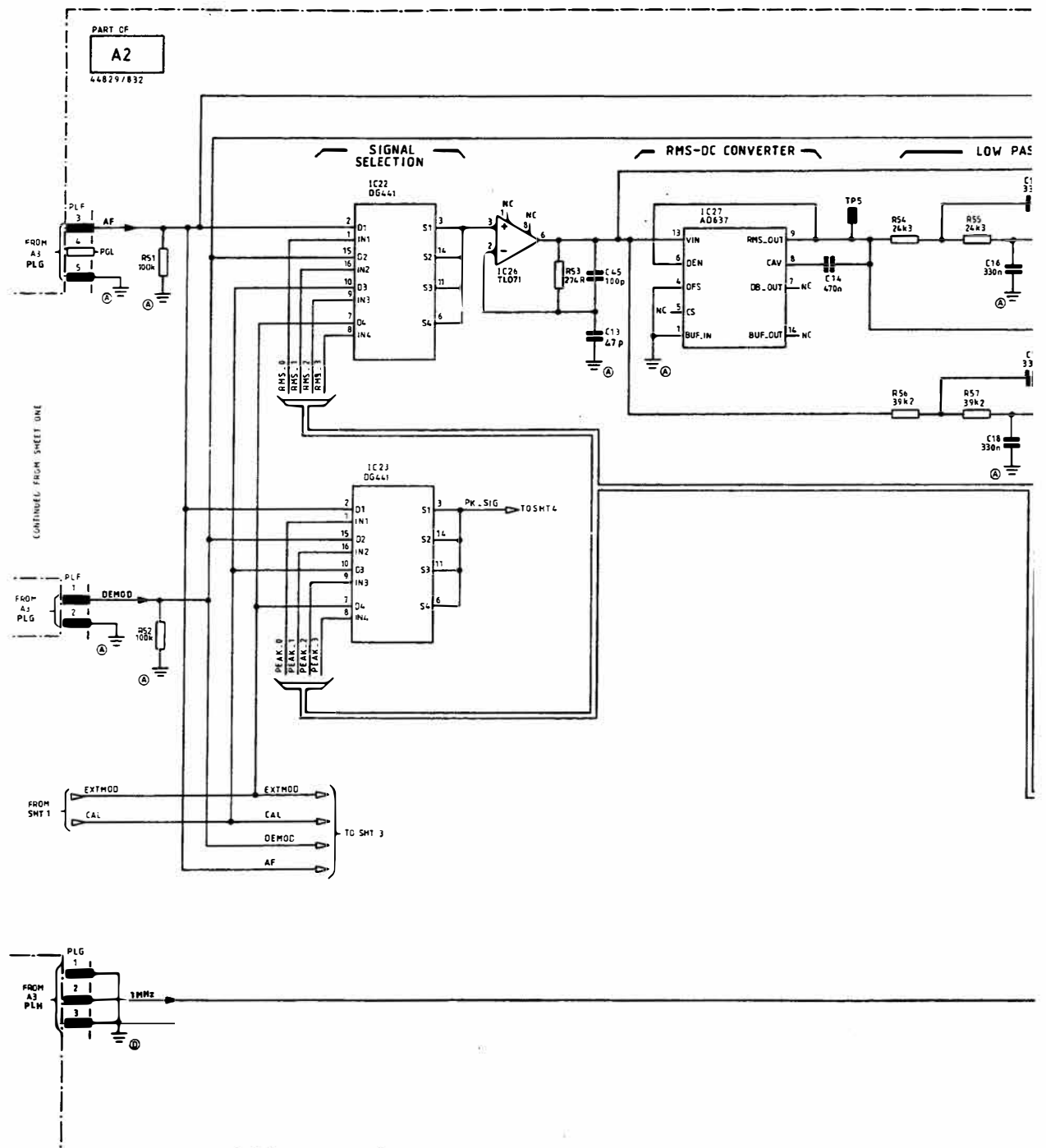
Circuit diagrams **A2**

Fig. 7-40 A2 Vertical shift, ext mod scaling, calibration ref gen - circuit



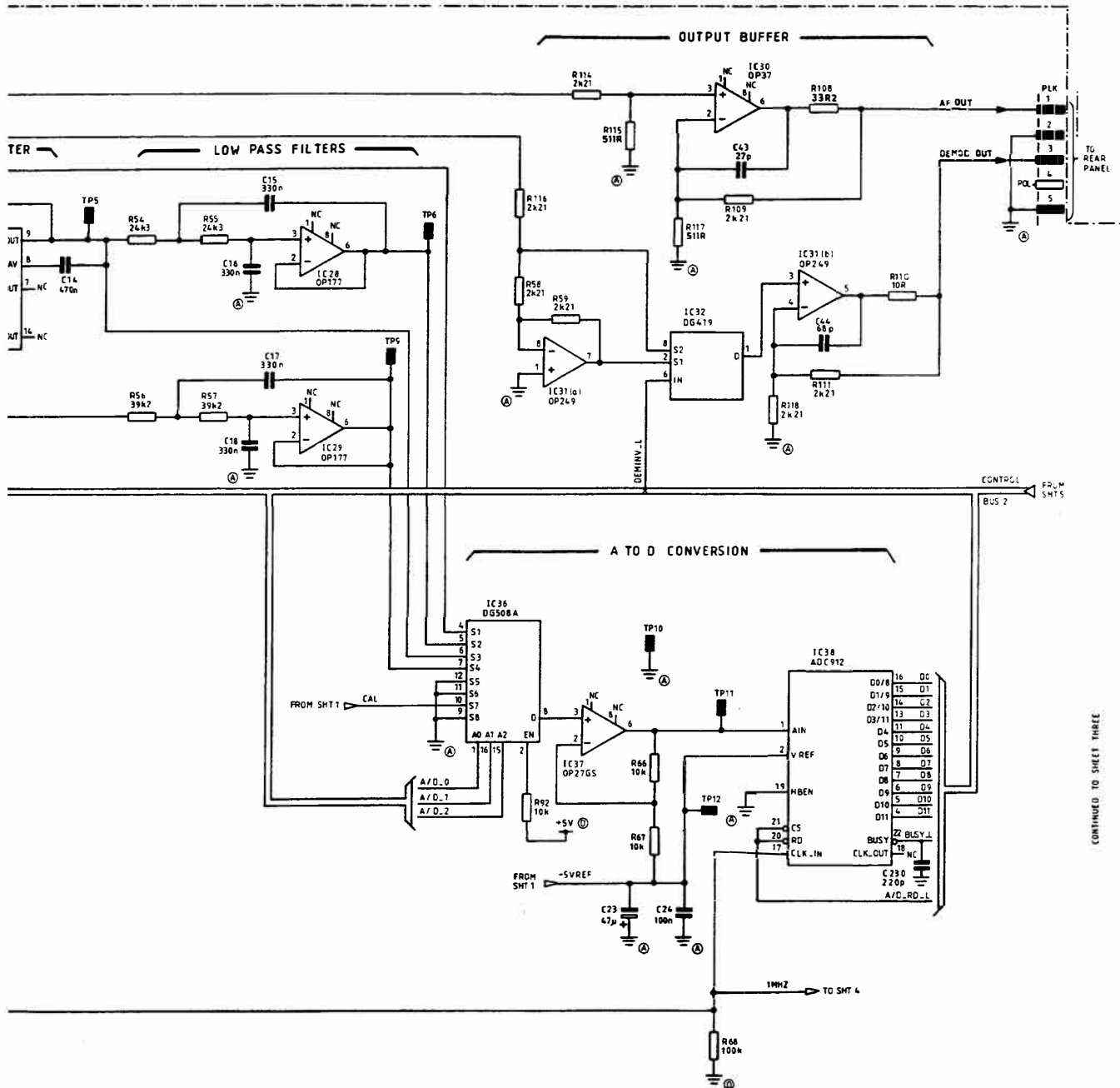
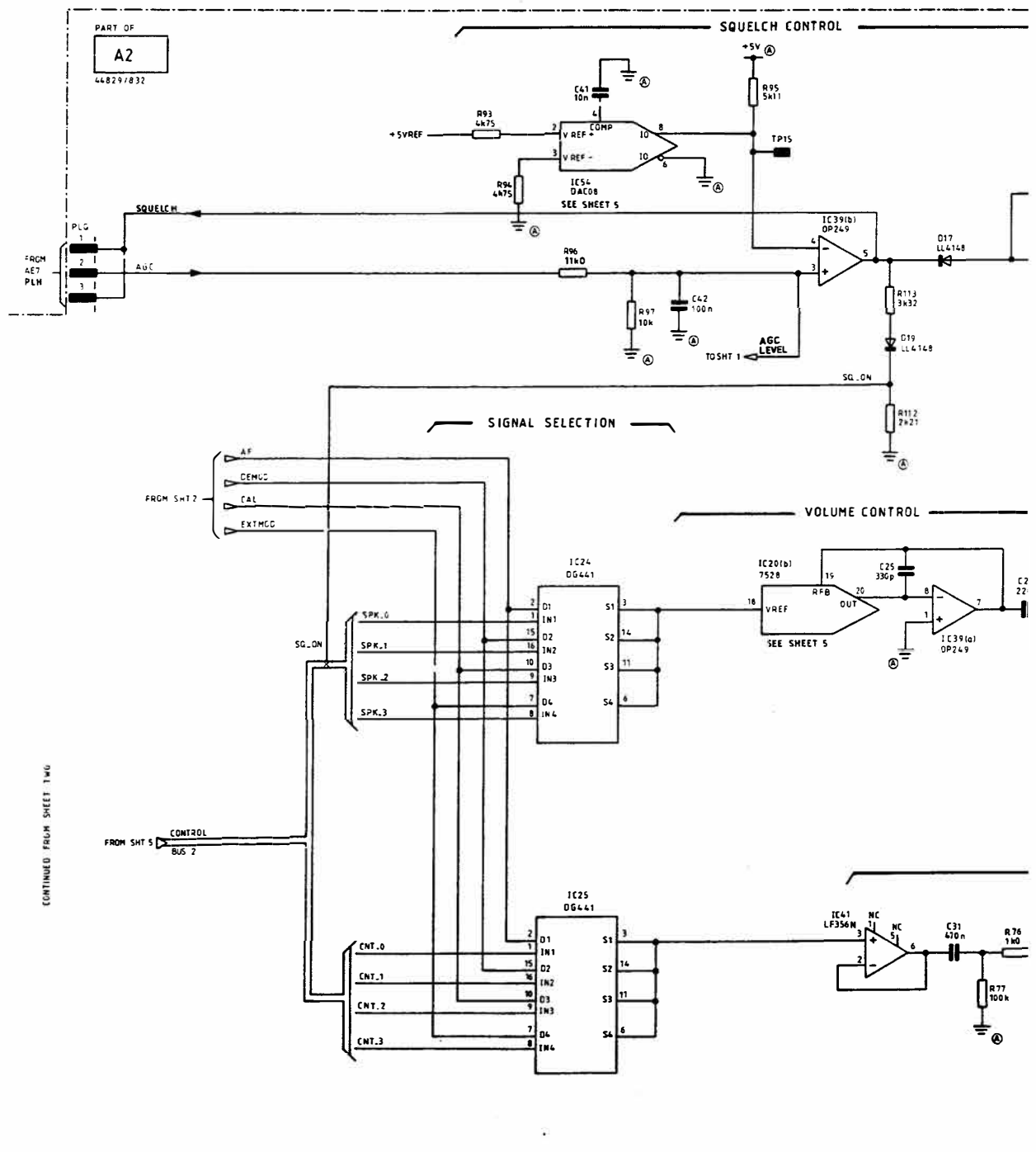
Circuit diagrams **A2**

Fig. 7-41 A2 Signal selection, RMS to DC converter, and ADC - circuit



Circuit diagrams **A2**

CONTROL

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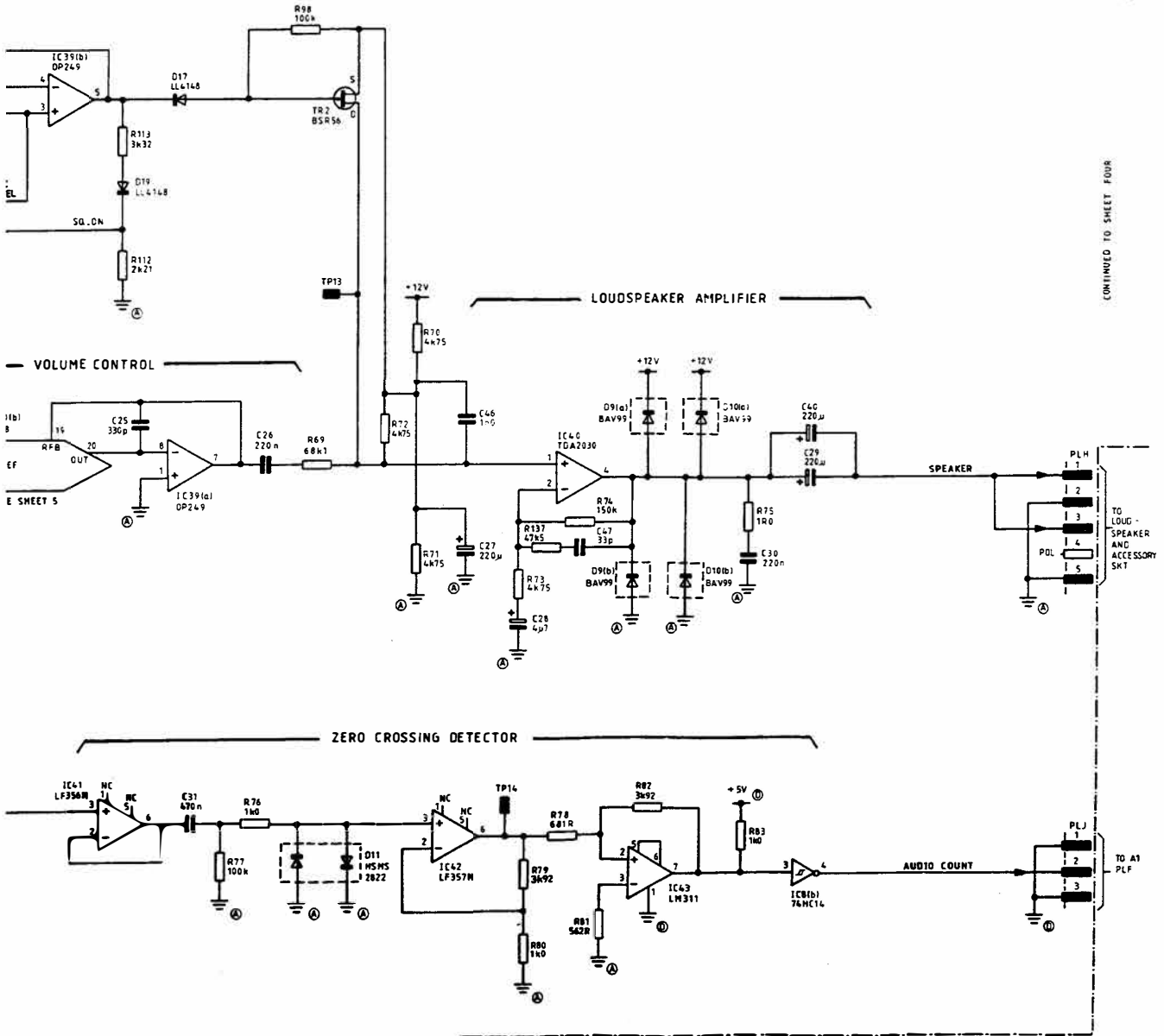
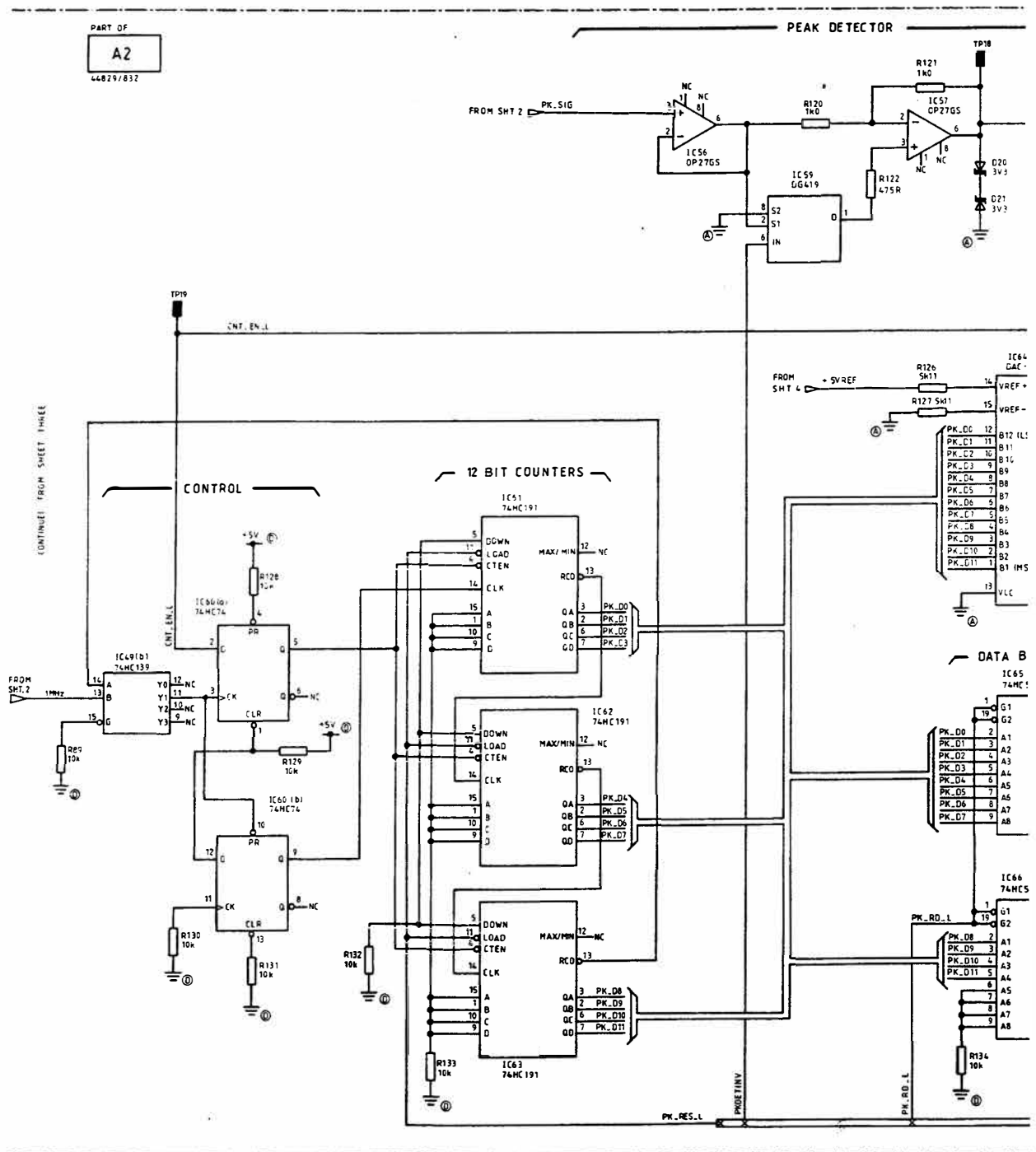


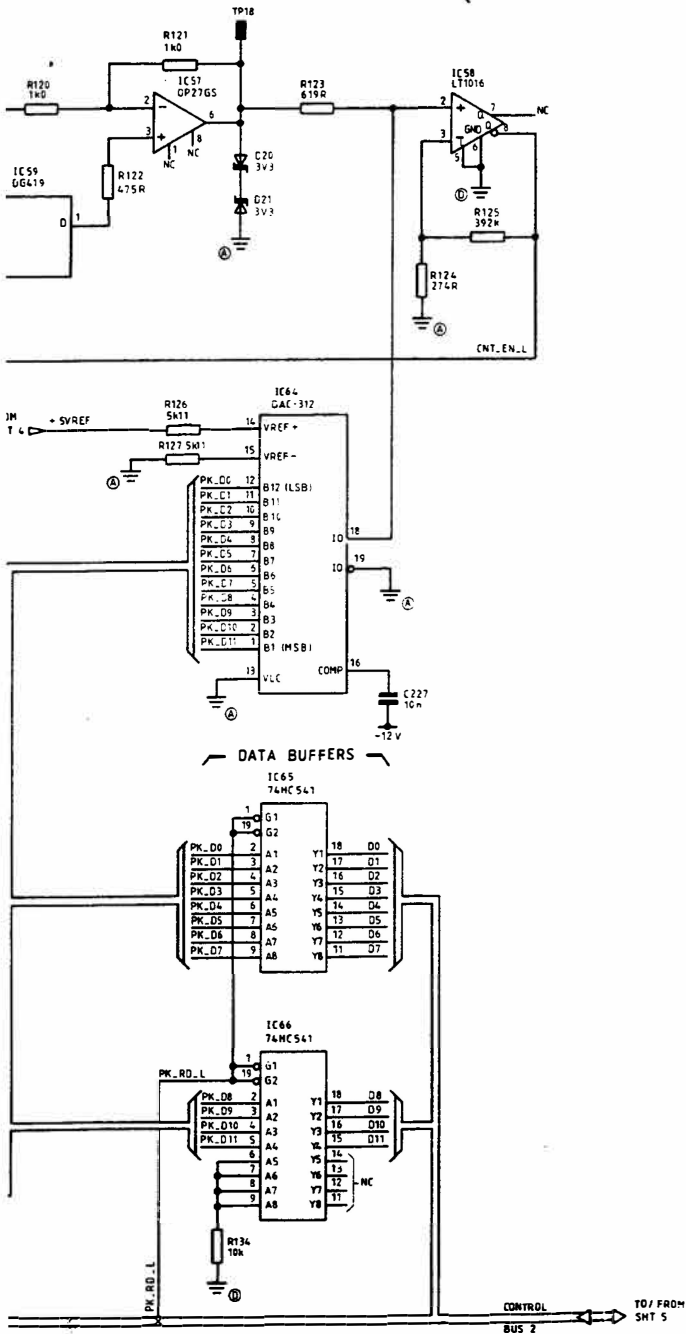
Fig. 7-42 A2 Squelch control, loudspeaker, and audio count channels - circuit





Circuit diagrams **A2**

## PEAK DETECTOR



SUPPLY LINE TABLE												
IC	TYPE	+12V PIN	-12V PIN	+5VA PIN	-5VA PIN	OVA PIN	OVD PIN	DECOUPLING +12V TO OVA	DECOUPLING -12V TO OVA	DECOUPLING +5VA TO OVA	DECOUPLING -5VA TO OVA	
1	OP249	5	2					C101	C102			
2	7528	17				1	5	C103				
3	CP249	6	2					C104	C105			
4	DG419	4	7	5		3		C106	C107			
5	OP249	5	2					C108	C109			
6	LF357			7	4					C110	C111	
7	LM311			8	4					C112	C113	
9	OP249	5	2					C114	C115			
11	OP177	7	4					C116	C117			
12	OP177	7	4					C118	C119			
13	OP177	7	4			14		C120	C121			
14	DG508A	13	3					C122	C123			
15	GP177	7	4					C124	C125			
16	OP177	7	4					C126	C127			
17	DG441	13	4			5		C128	C129			
18	OP249	5	2					C130	C131			
19	DG419	4	7	5		3		C132	C133			
20	7528	17				1	5	C134				
21	OP249	5	2					C135	C136			
22	DG441	13	4			5		C137	C138			

IC	TYPE	+12V PIN	-12V PIN	+5VA PIN	-5VA PIN	OVA PIN	OVD PIN	DECOUPLING +12V TO OVA	DECOUPLING -12V TO OVA	DECOUPLING +5VA TO OVA	DECOUPLING -5VA TO OVA	
23	DG441	13	4			5		C139	C140			
24	DG441	13	4			5		C141	C142			
25	DG441	13	4			5		C143	C144			
26	OP27GS	7	4					C145	C146			
27	AD637	11	10			3		C147	C148			
28	OP177	7	4					C149	C150			
29	OP177	7	4					C151	C152			
30	OP27GS	7	4					C153	C154			
31	OP249	5	2					C155	C156			
32	DG419	4	7	5		3		C157	C158			
35	DG508A	13	3			14		C159	C160			
37	OP27GS	7	4					C167	C168			
38	AD912	23	24			3	12			C169		
39	OP249	5	2					C171	C172			
40	2030	5				3		C173				
41	LF356	7	4					C174	C175			
42	LF357			7	4					C176	C177	
43	LM311			8	4					C178	C179	
54	DAC06	1	7					C180	C181			
56	OP27GS	7	4					C182	C183			
57	OP27GS	7	4					C184	C185			
58	LT1016			1	4					C186	C187	
59	DG419	4	7	5		3		C188	C189			
64	DAC312	20	17					C220	C221			

IC	TYPE	+5VD PIN	OVD PIN	DECOUPLING +5VD TO OVD
8	HC14	14	7	C180
44	8574	16	8	C181
45	8574	16	8	C182
46	8574	16	8	C183
47	8574	16	8	C184
48	8574	16	8	C185
49	HC139	16	8	C186
50	HC139	16	8	C187
51	HC139	16	8	C188
55	HC374	20	10	C189
60	HC74	14	7	C220
61	HC191	16	8	C221
62	HC191	16	8	C222
63	HC191	16	8	C223
65	HC541	20	10	C224
66	HC541	20	10	C225
67	HC138	16	8	C226

## EXTRA ELECTROLYTIC DECOUPLING

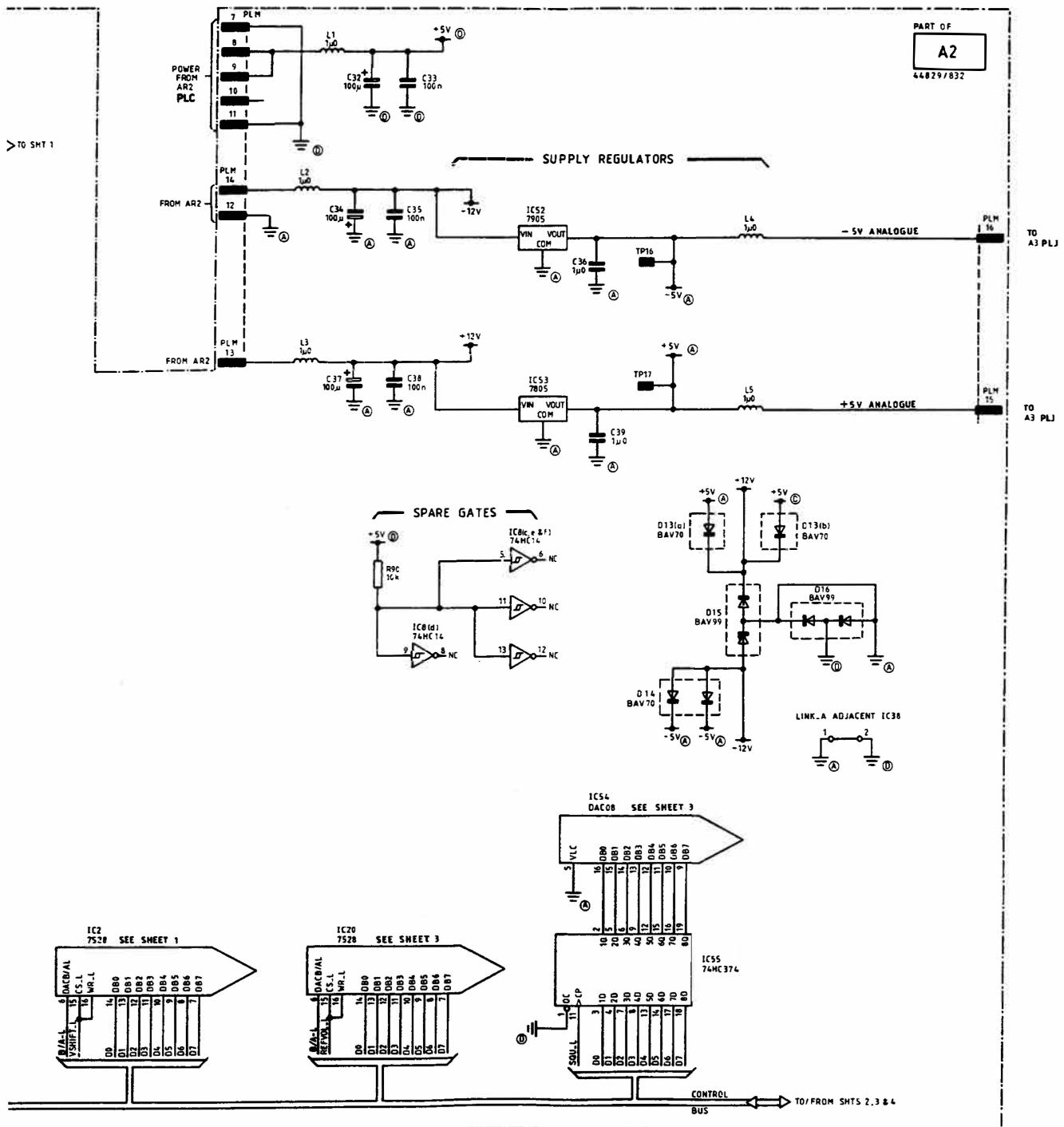
CAP	VALUE	NEAR IC	+VE PIN	-VE PIN
C200	10u	7	+5VA	OVA
C201	10u	7	OVA	-5VA
C202	10u	27	+12V	OVA
C203	10u	27	OVA	-12V
C208	10u	38	+5VA	OVA
C209	10u	38	OVA	-12V
C210	220u	40	+12V	OVA
C211	220u	40	+12V	OVA
C212	10u	43	+5VA	OVA
C213	10u	43	OVA	-5VA
C214	10u	58	+5VA	-5VA

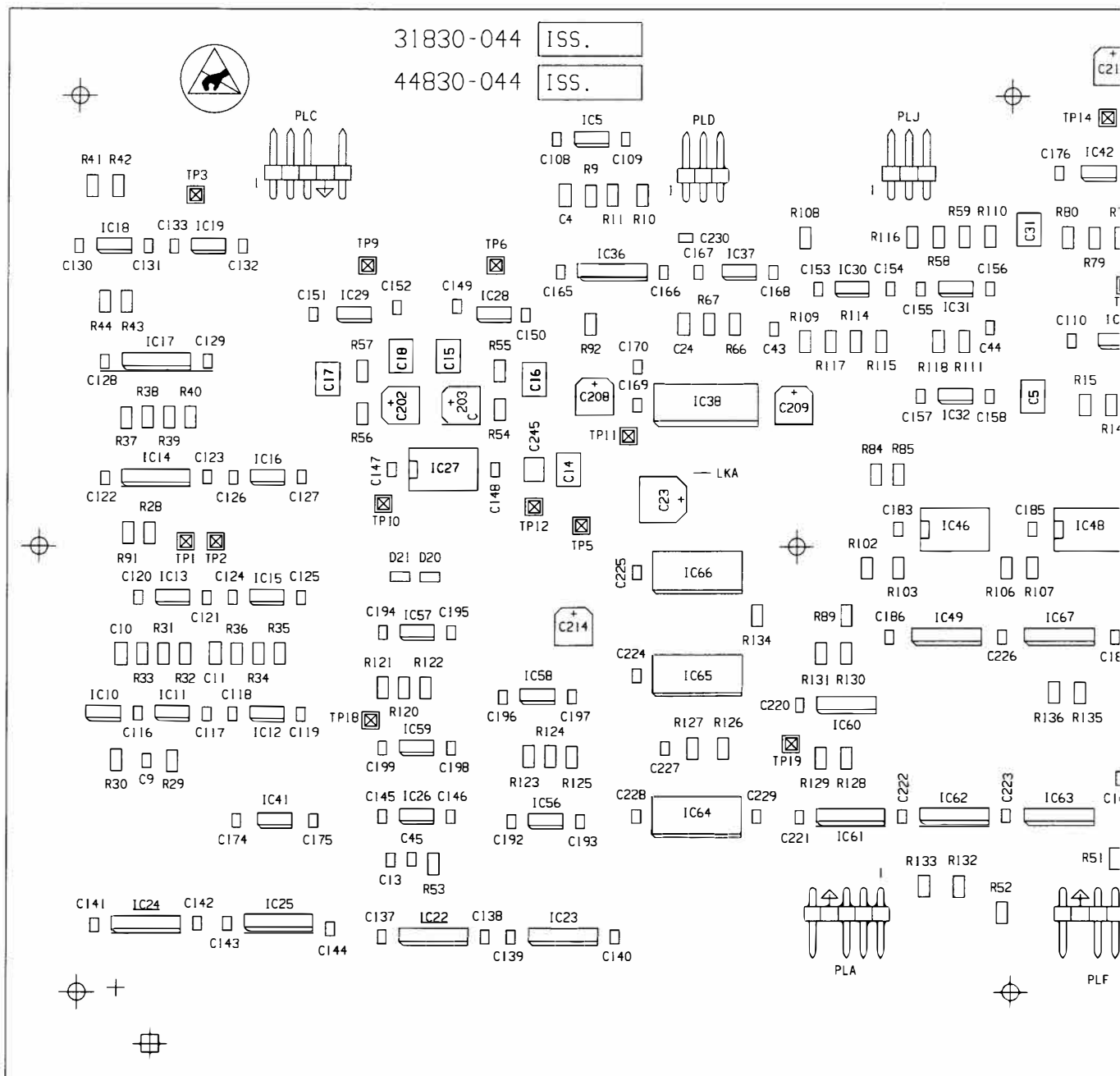
C101 TO C158  
C165 TO C199  
C220 TO C226  
C228 TO C229  
ALL TO n

CONTINUE TO SHEET FIVE

Fig. 7-43 A2 Peak detector - circuit



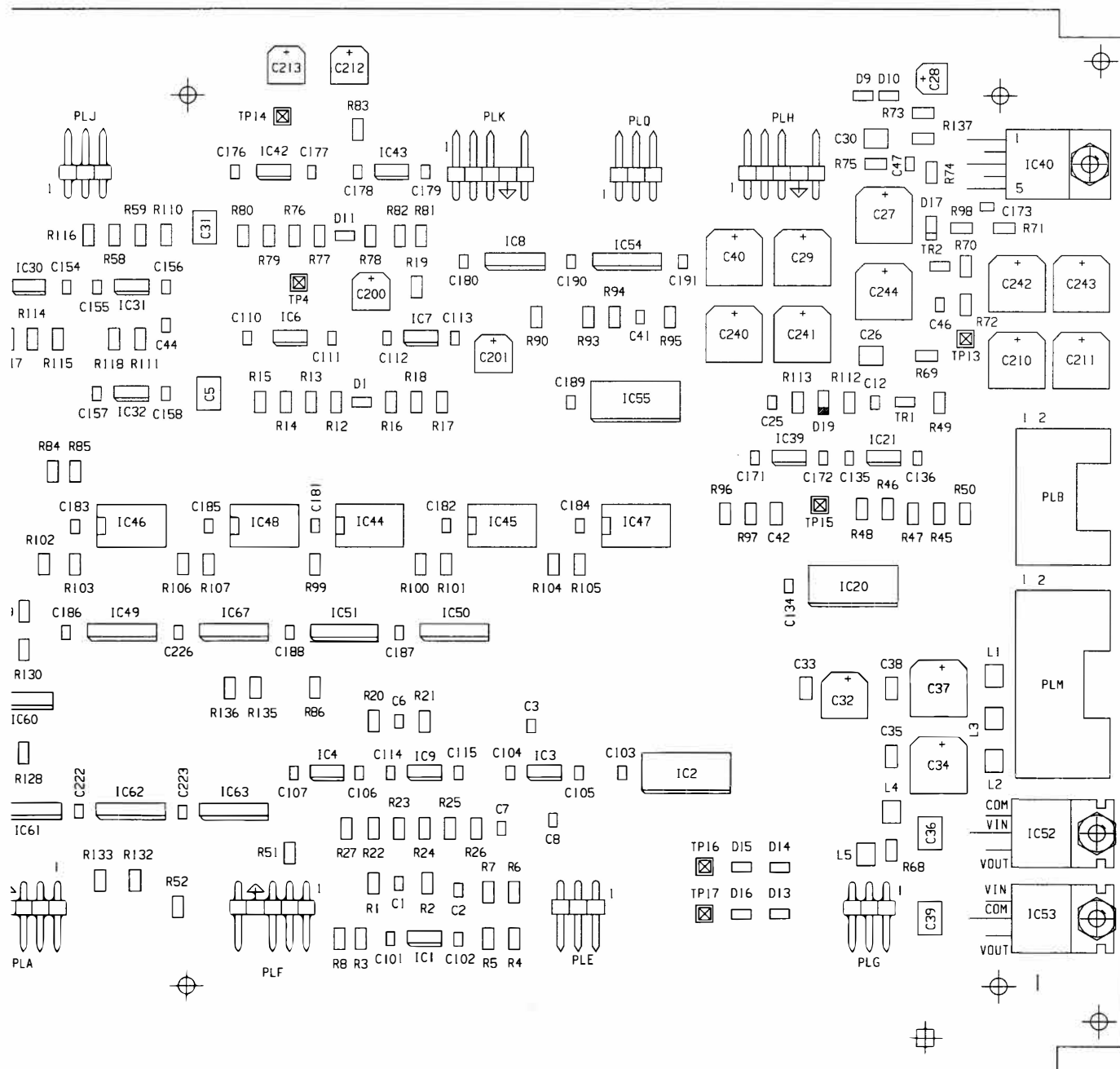
Circuit diagrams **A2**Fig. 7-44 A2 I<sup>2</sup>C interface, supply regulators - circuit



## I<sup>2</sup>C interface, supply regulators A2

Drg. No. 44830/044

## Component layout **A2/2**





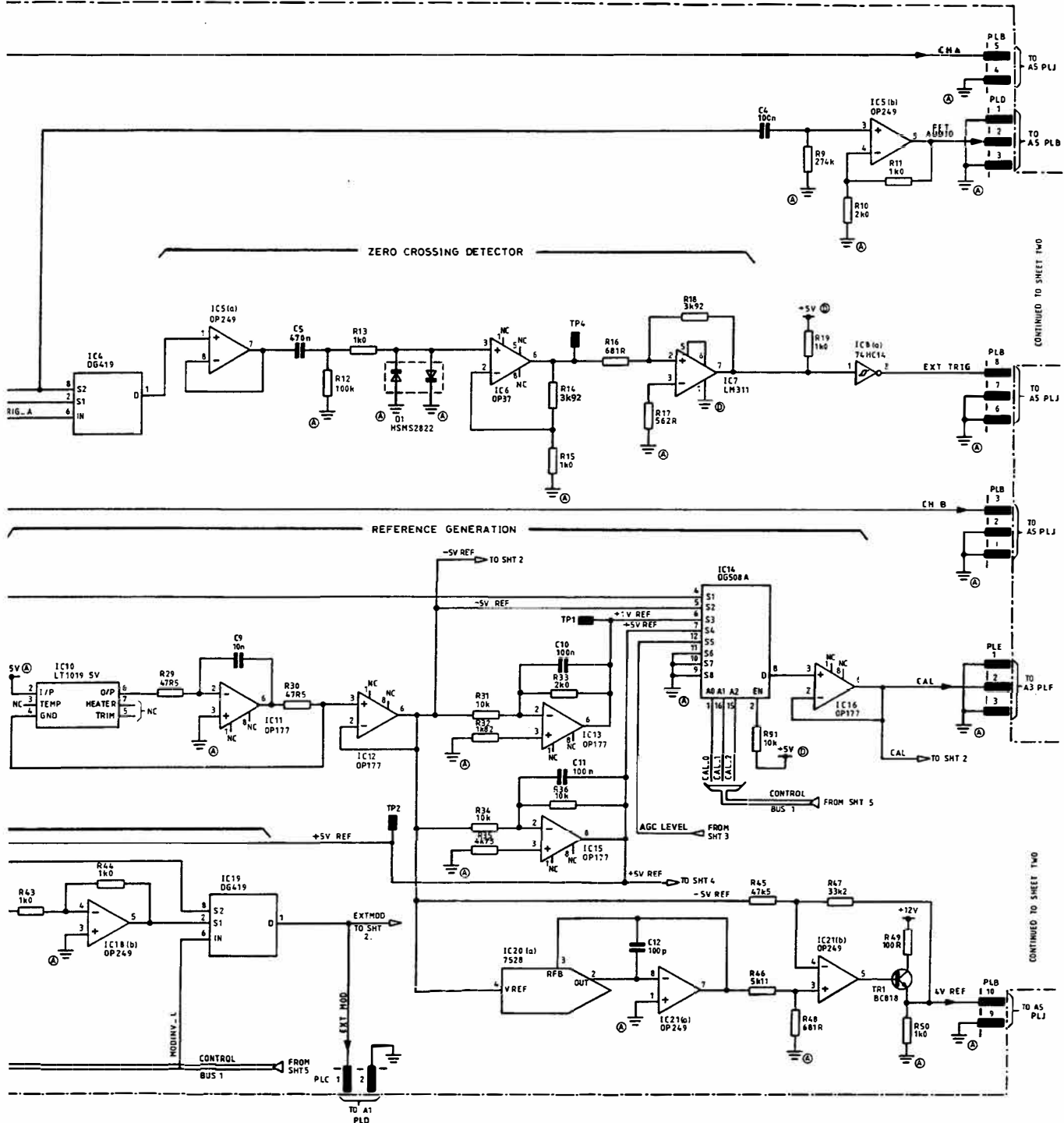
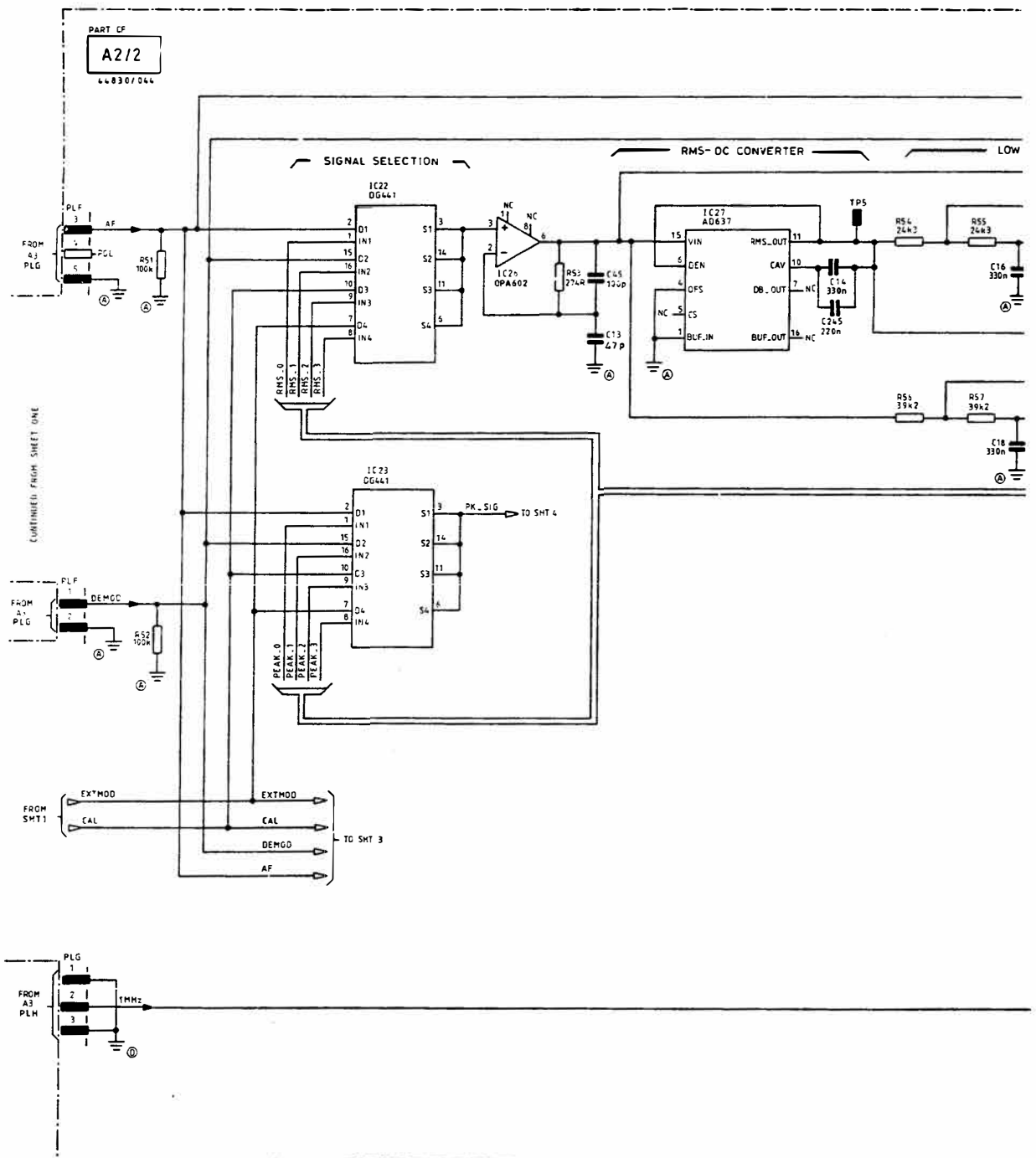
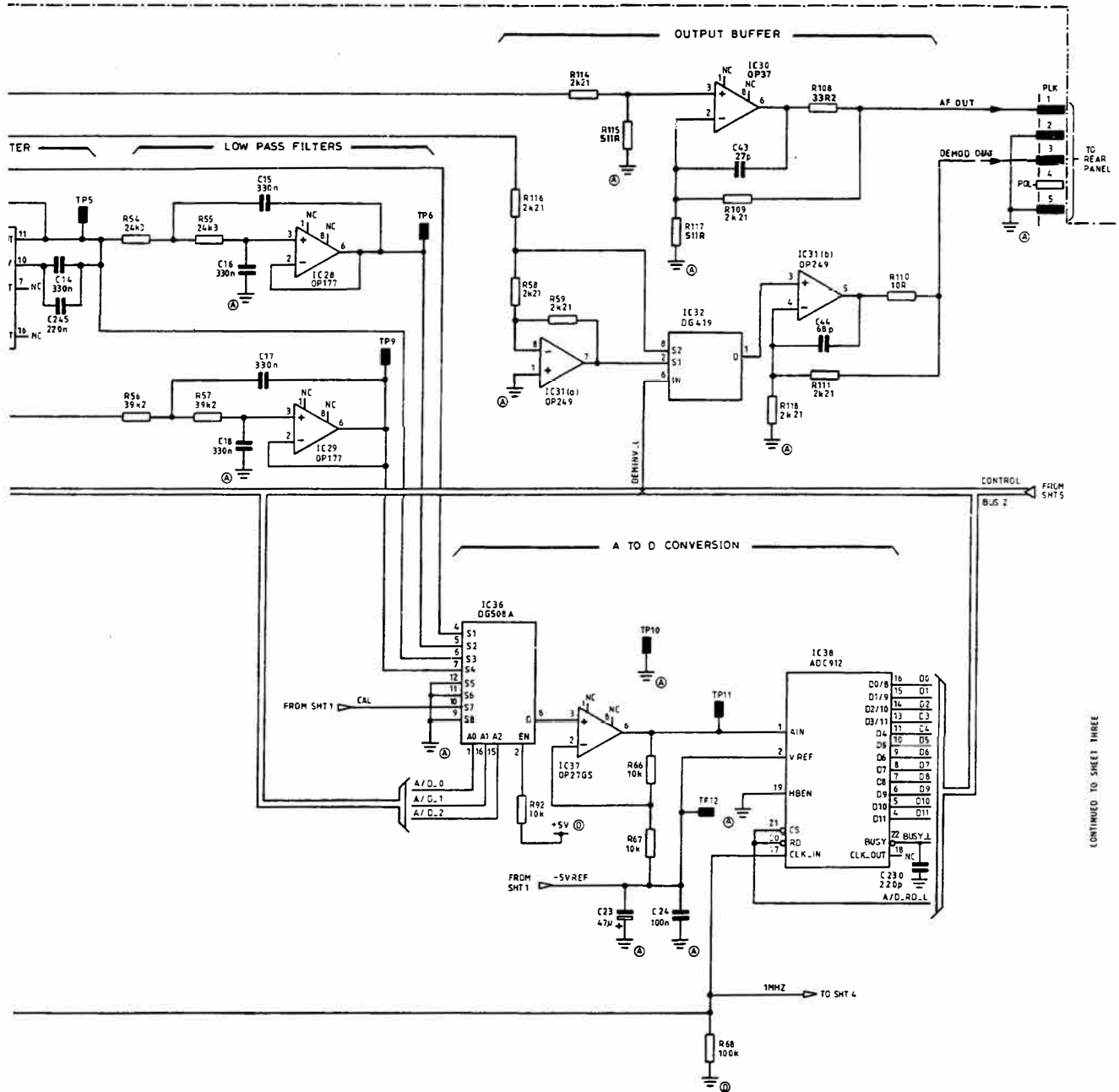
Circuit diagrams **A2/2**

Fig. 7-46 A2/2 Vertical shift, ext mod scaling, calibration ref gen - circuit

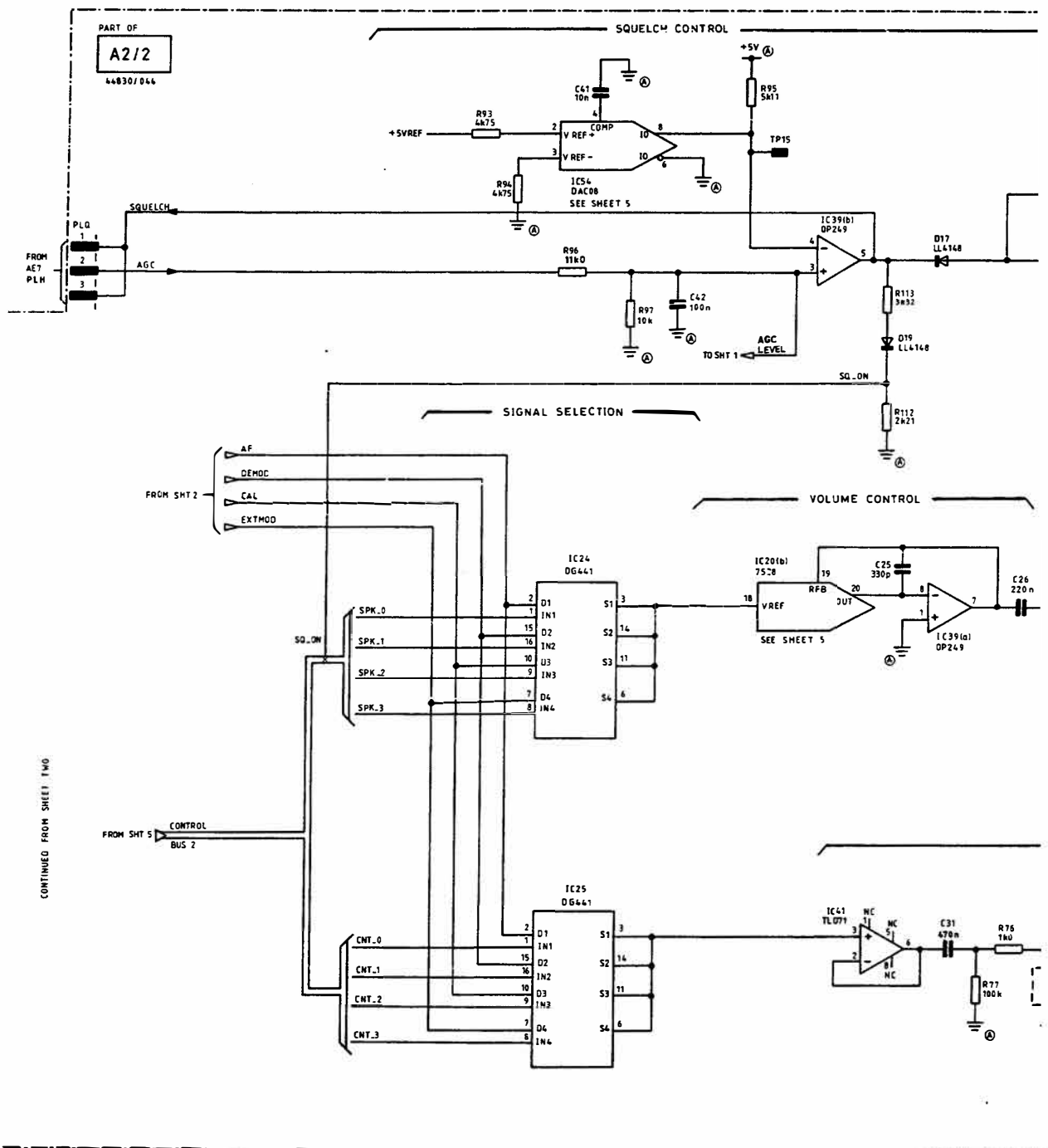




Circuit diagrams **A2/2**

CONTINUED TO SHEET THREE

Fig. 7-47 A2/2 Signal selection, RMS to DC converter and ADC - circuit



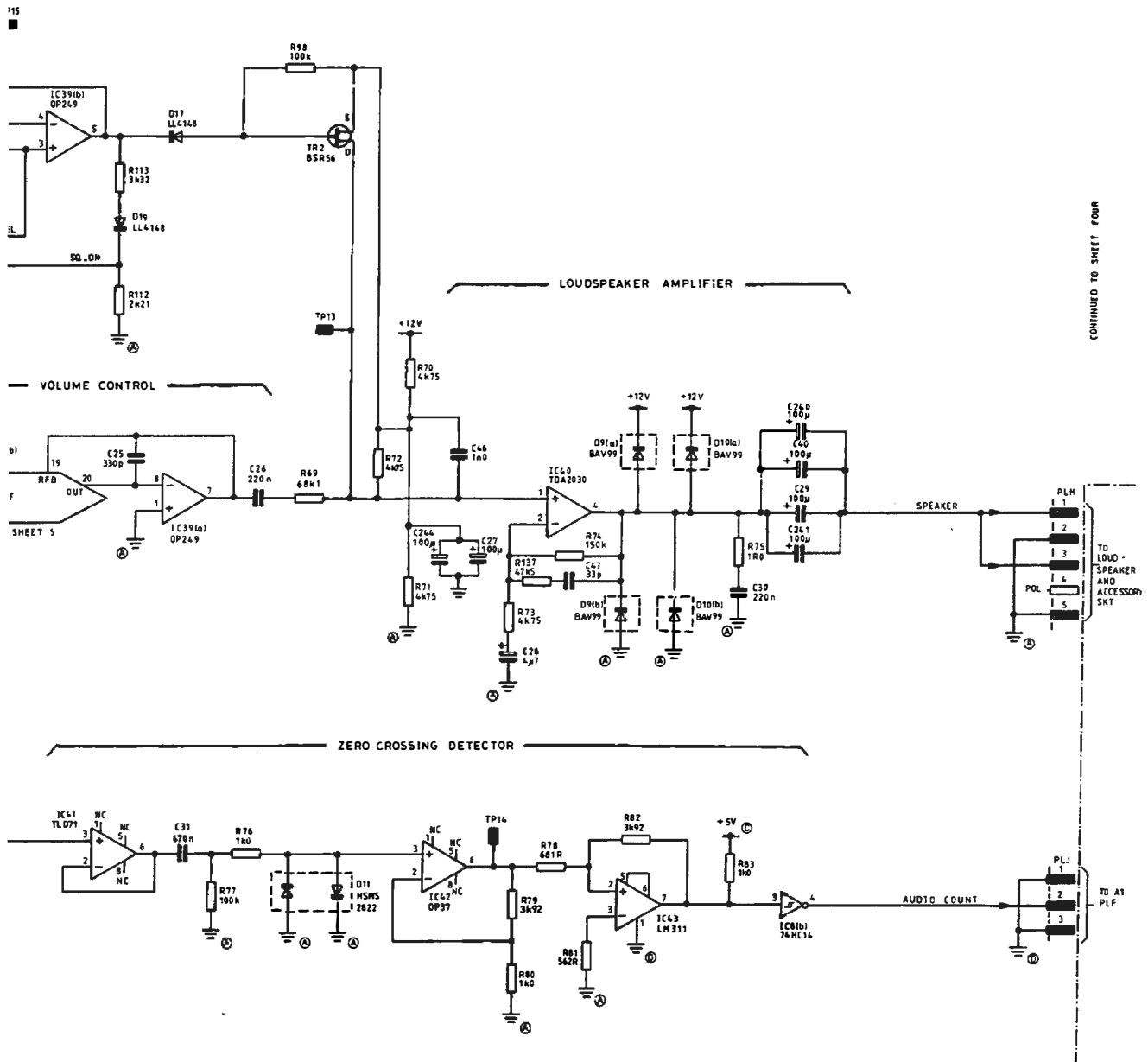
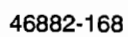
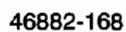
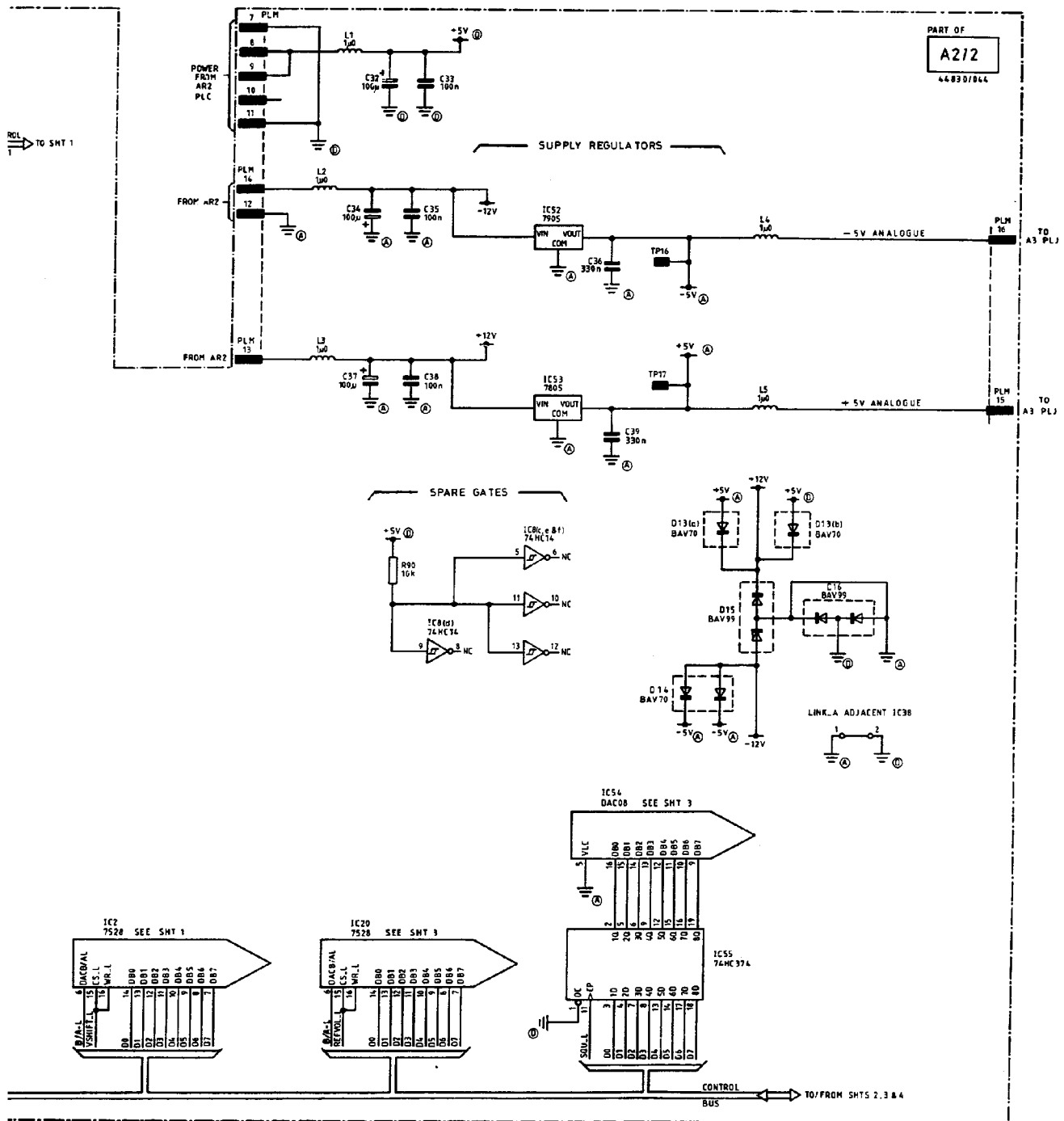
Circuit diagrams **A2/2**

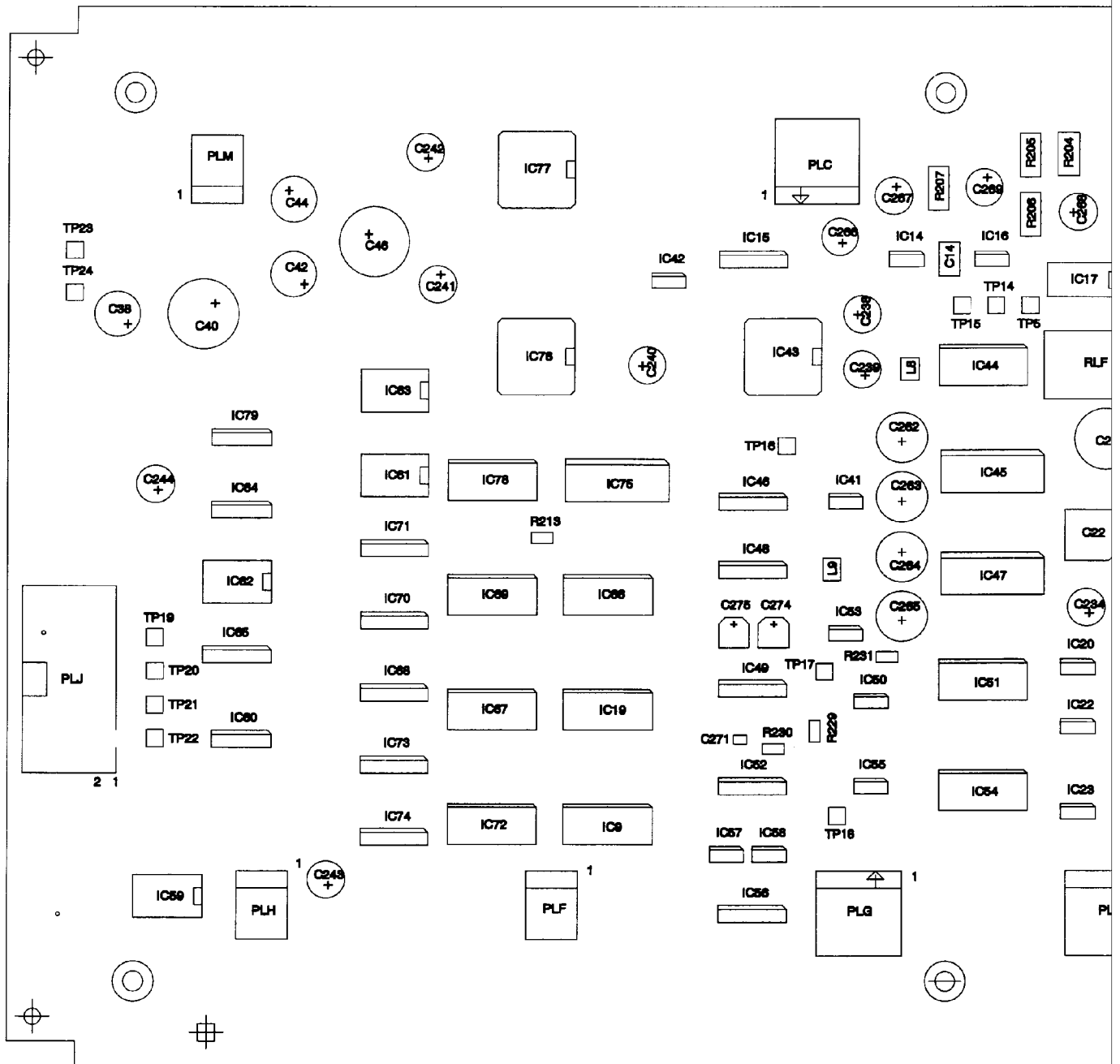
Fig. 7-48 A2/2 Squelch control, loudspeaker, and audio count channels - circuit







Circuit diagrams **A2/2**Fig. 7-50 A2/2 I<sup>2</sup>C interface, supply regulators - circuit

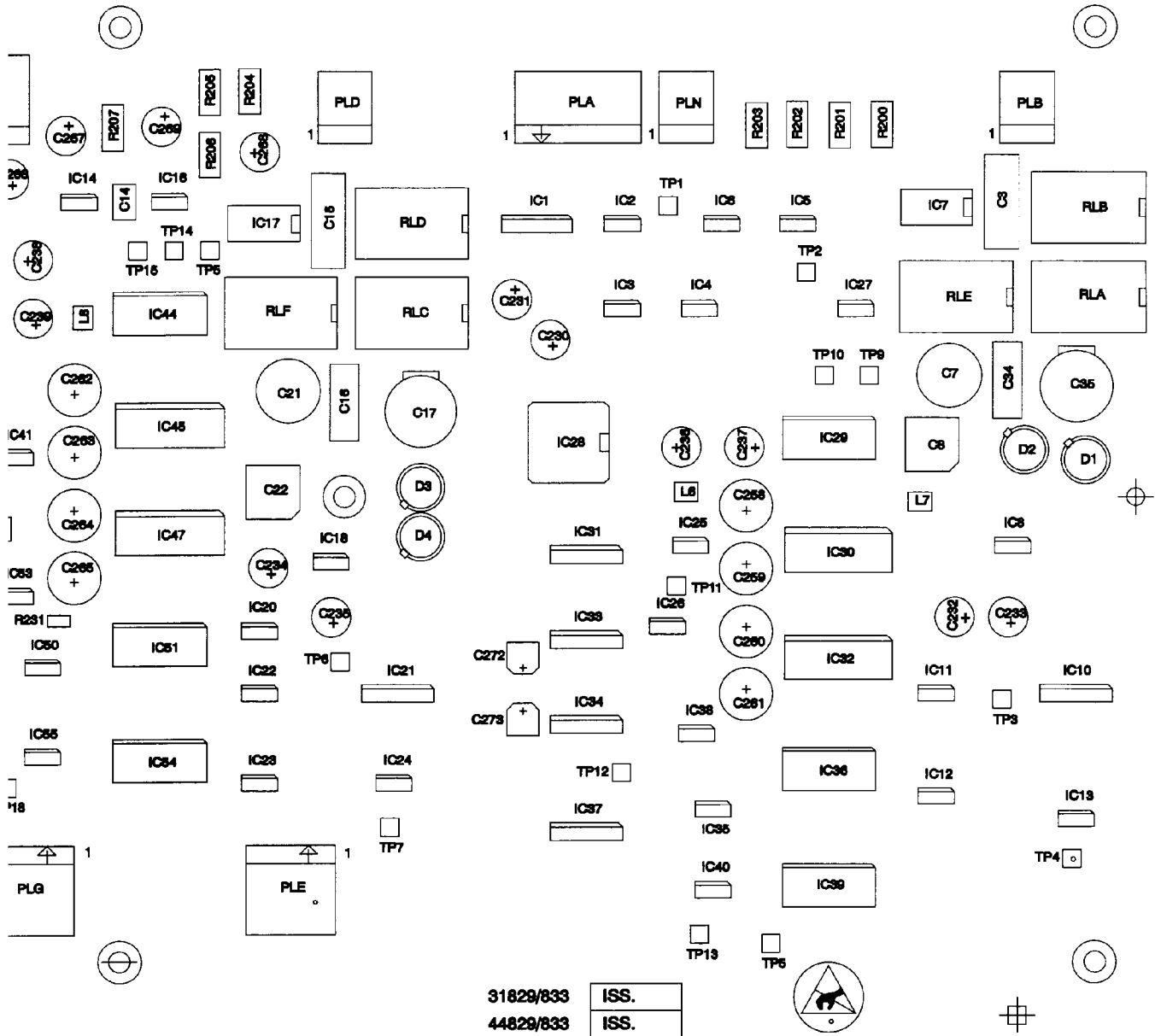


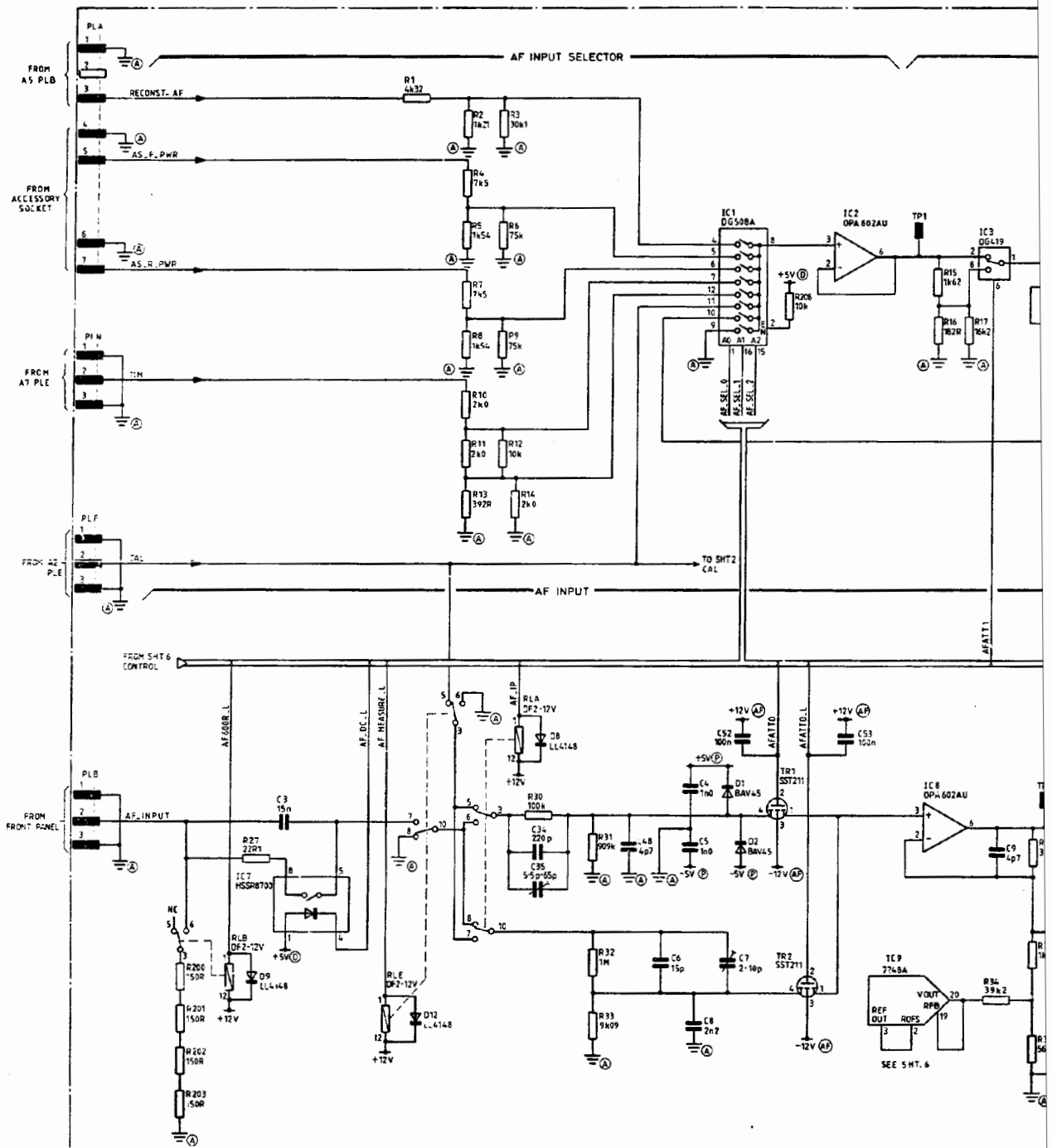
I<sup>2</sup>C interface, supply regulators **A2/2**

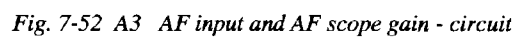
Drg. No. 44829/833

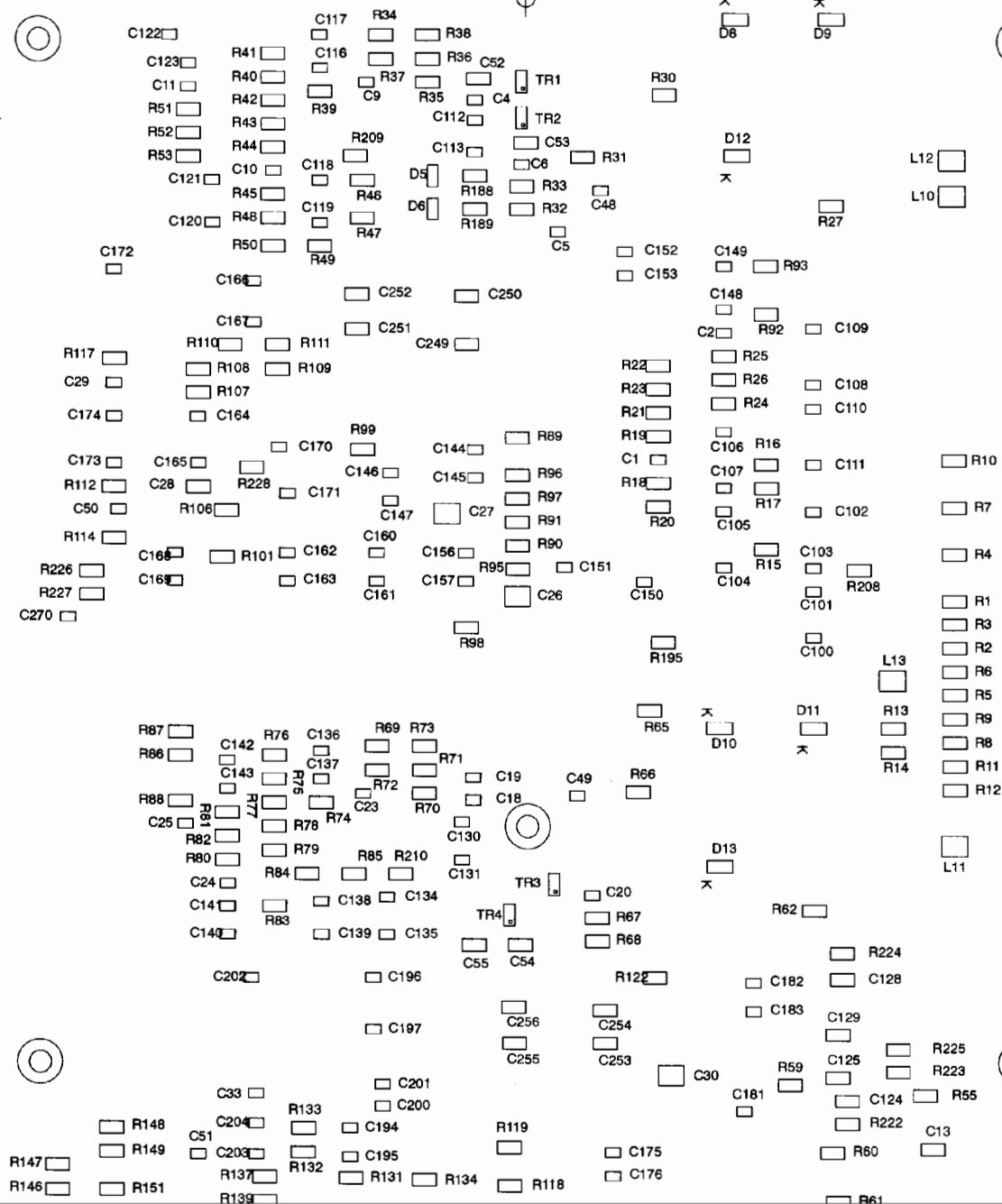


## Component layout **A3**



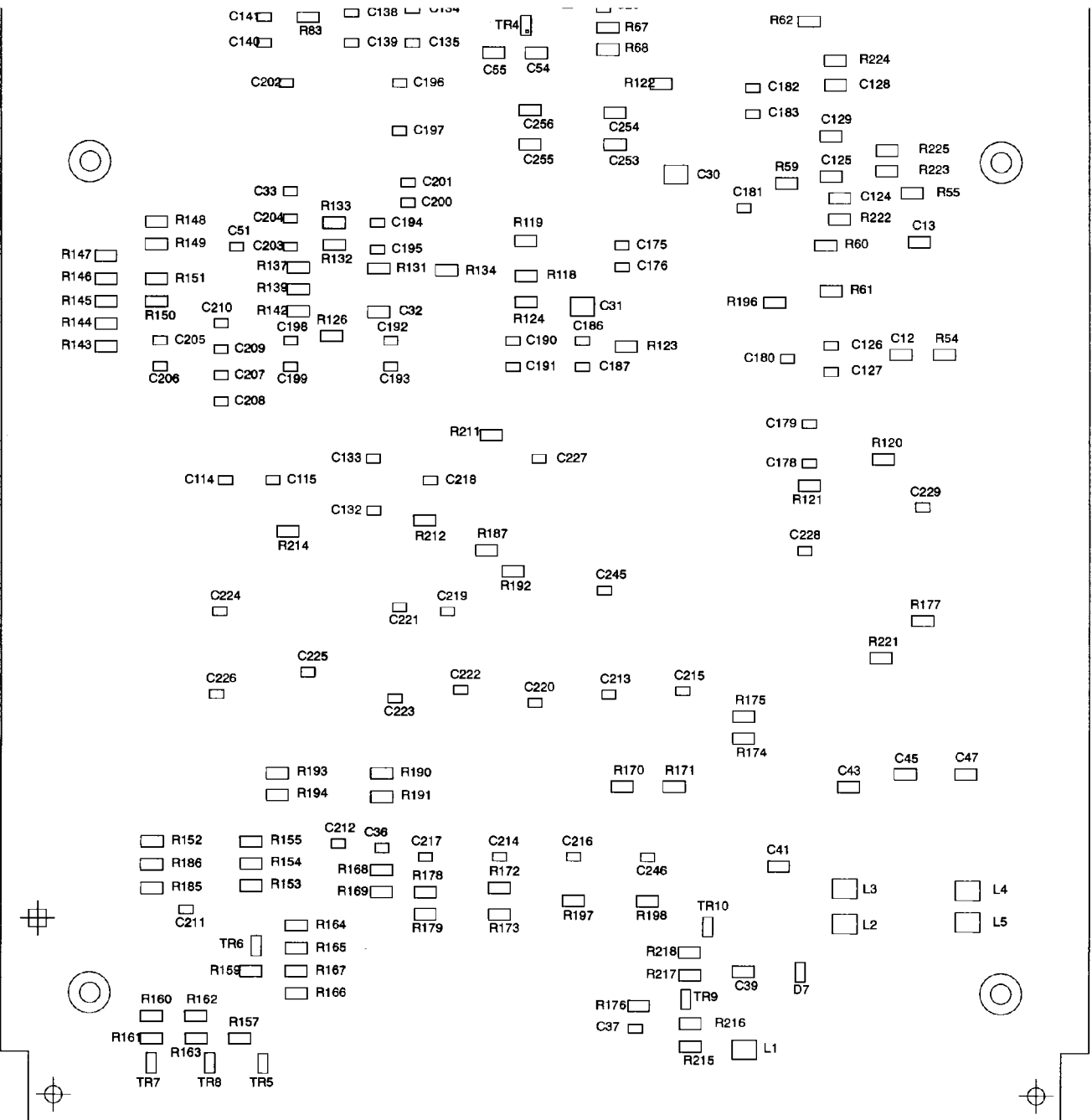






AF input and AF scope gain A3

Dwg. No. 44829/833



A3

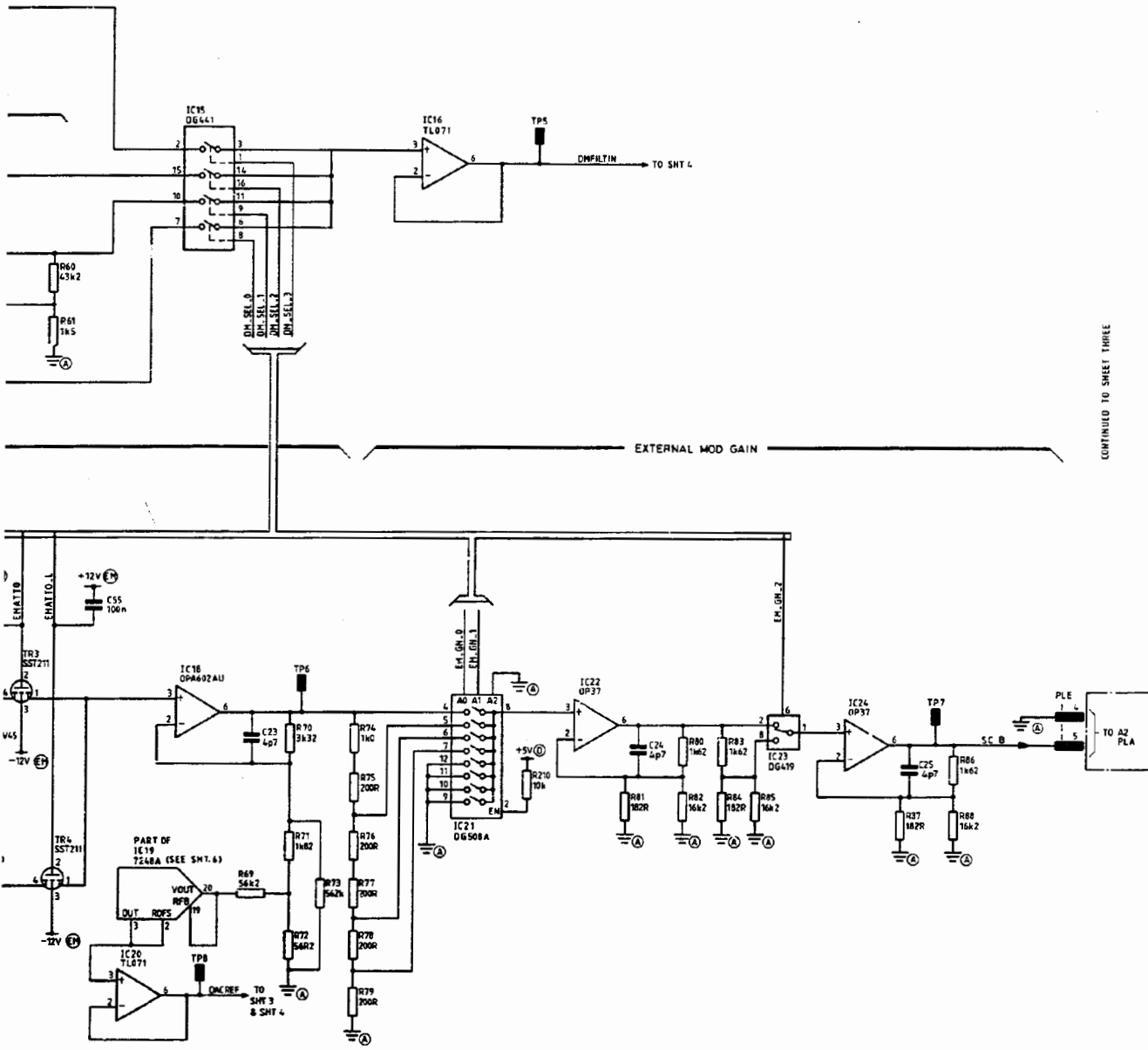
Fig. No. 44829/833 Sheet 1 of 2 Issue 1

Fig. 7-53 A3 Audio processor 1 - component layout, solder side



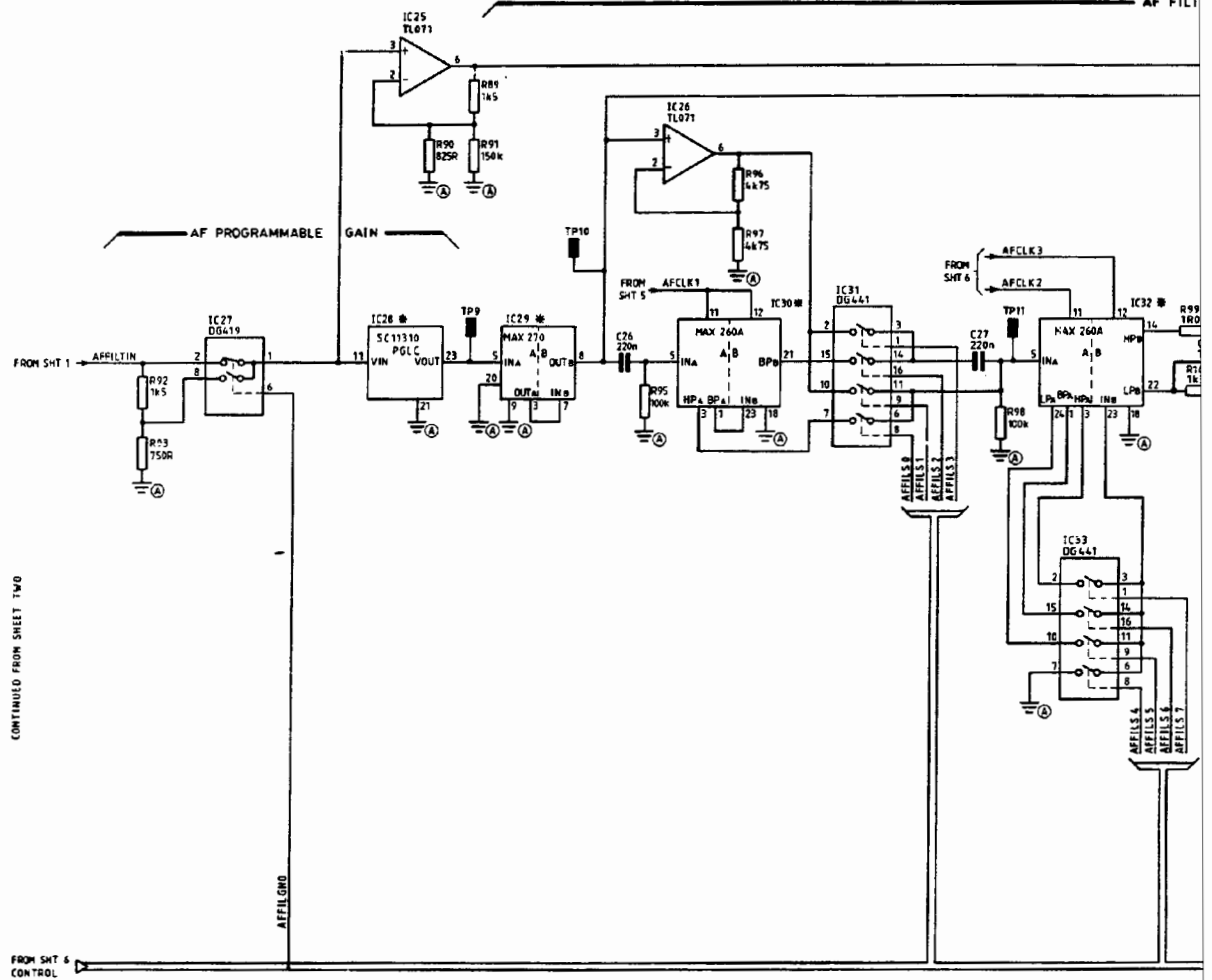
Circuit diagrams **A3**

INPUT SELECTOR



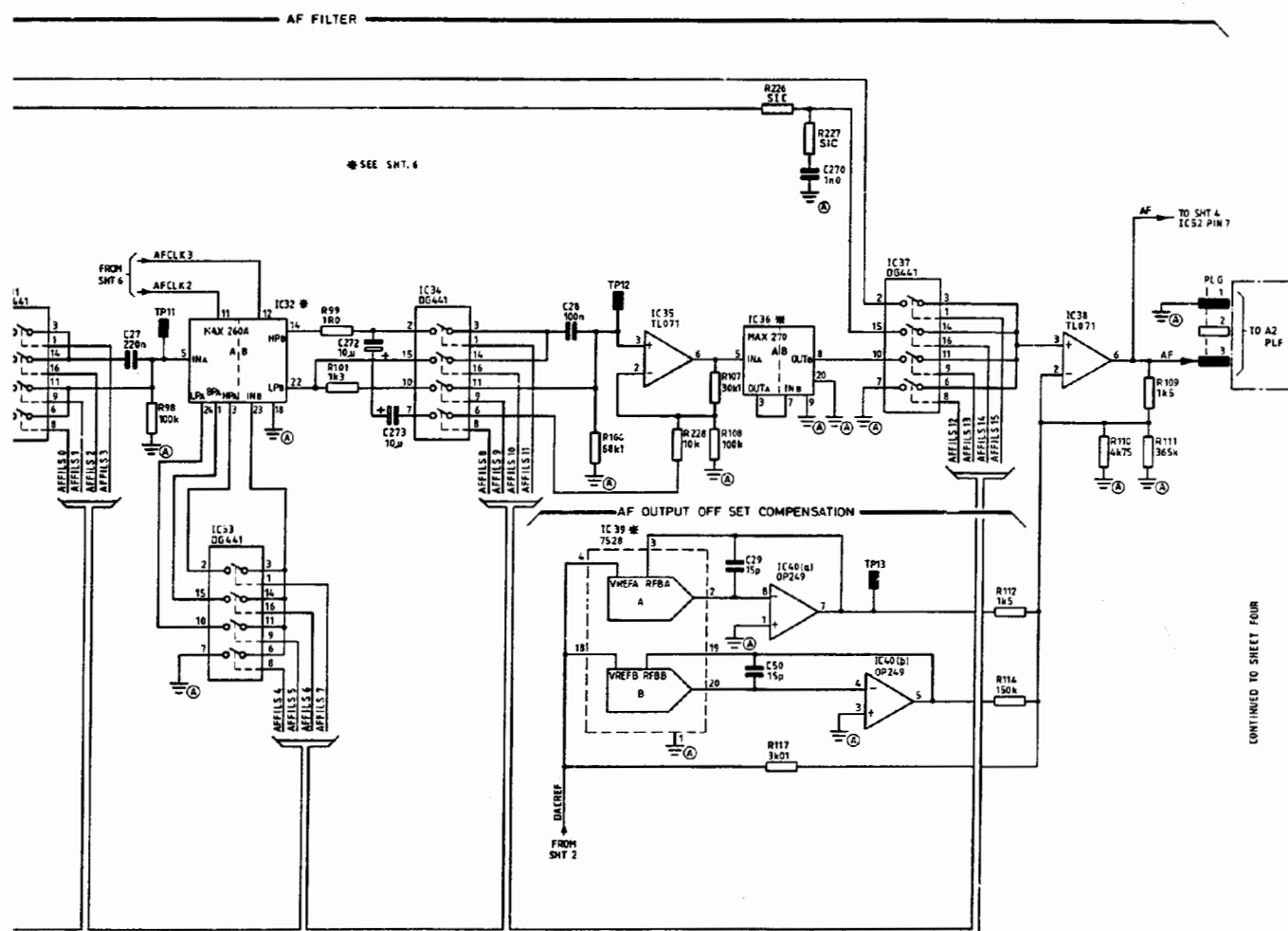
CONTINUED TO SHEET THREE

Fig. 7-54 A3 Demodulation input selection, ext mod input and gain - circuit

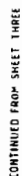




## Circuit diagrams A3



*Fig. 7-55 A3 AF filter - circuit*



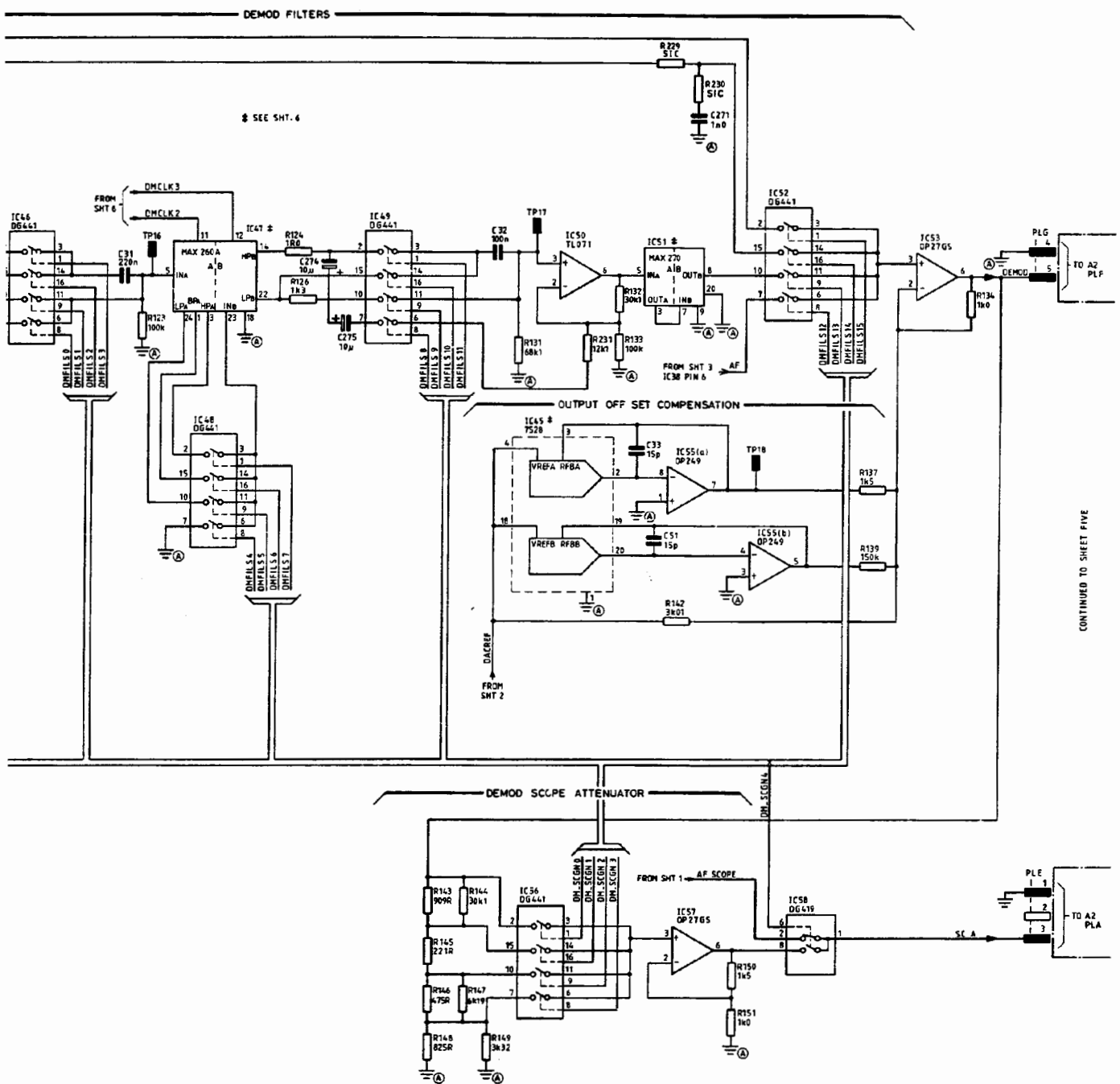
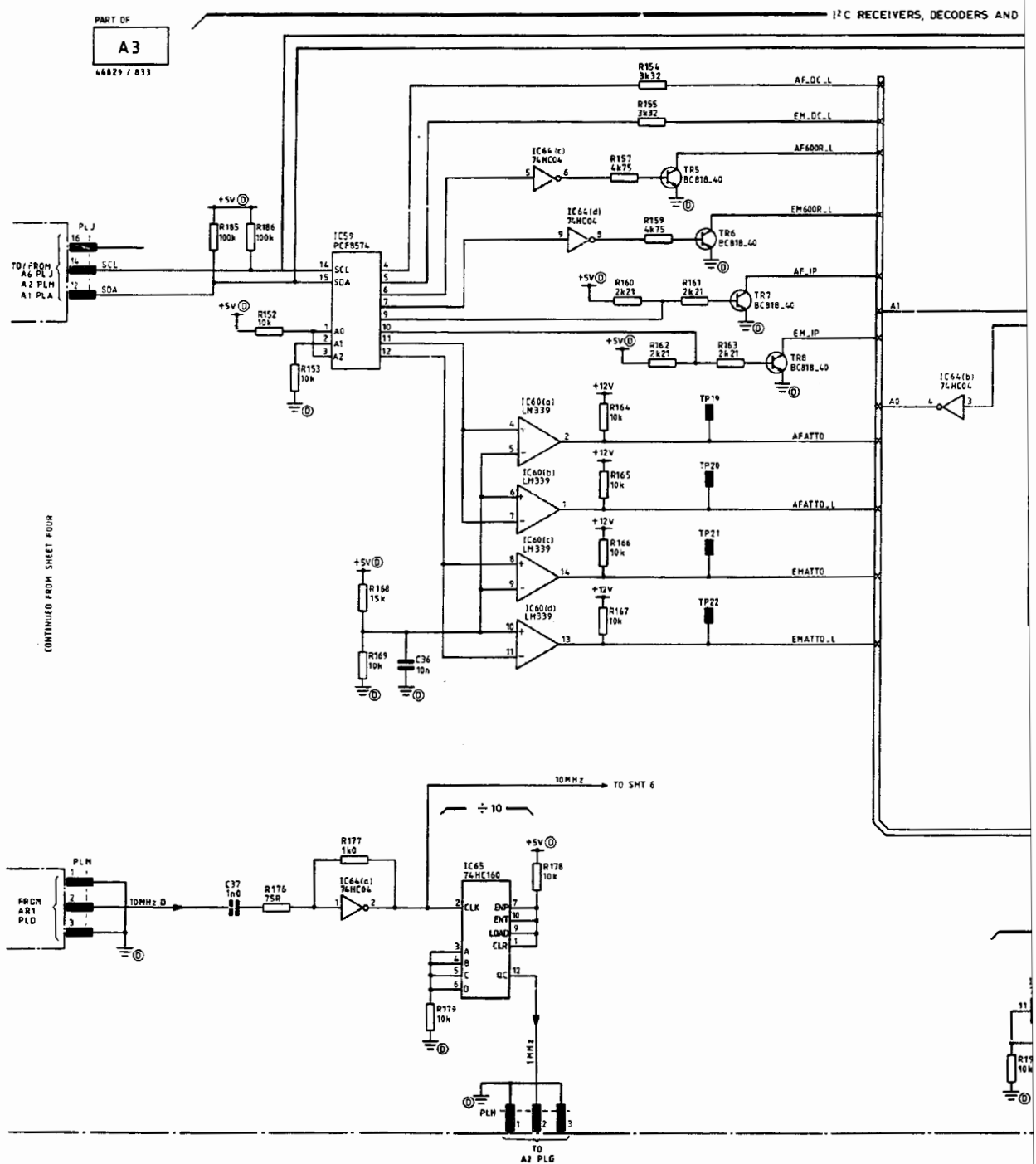
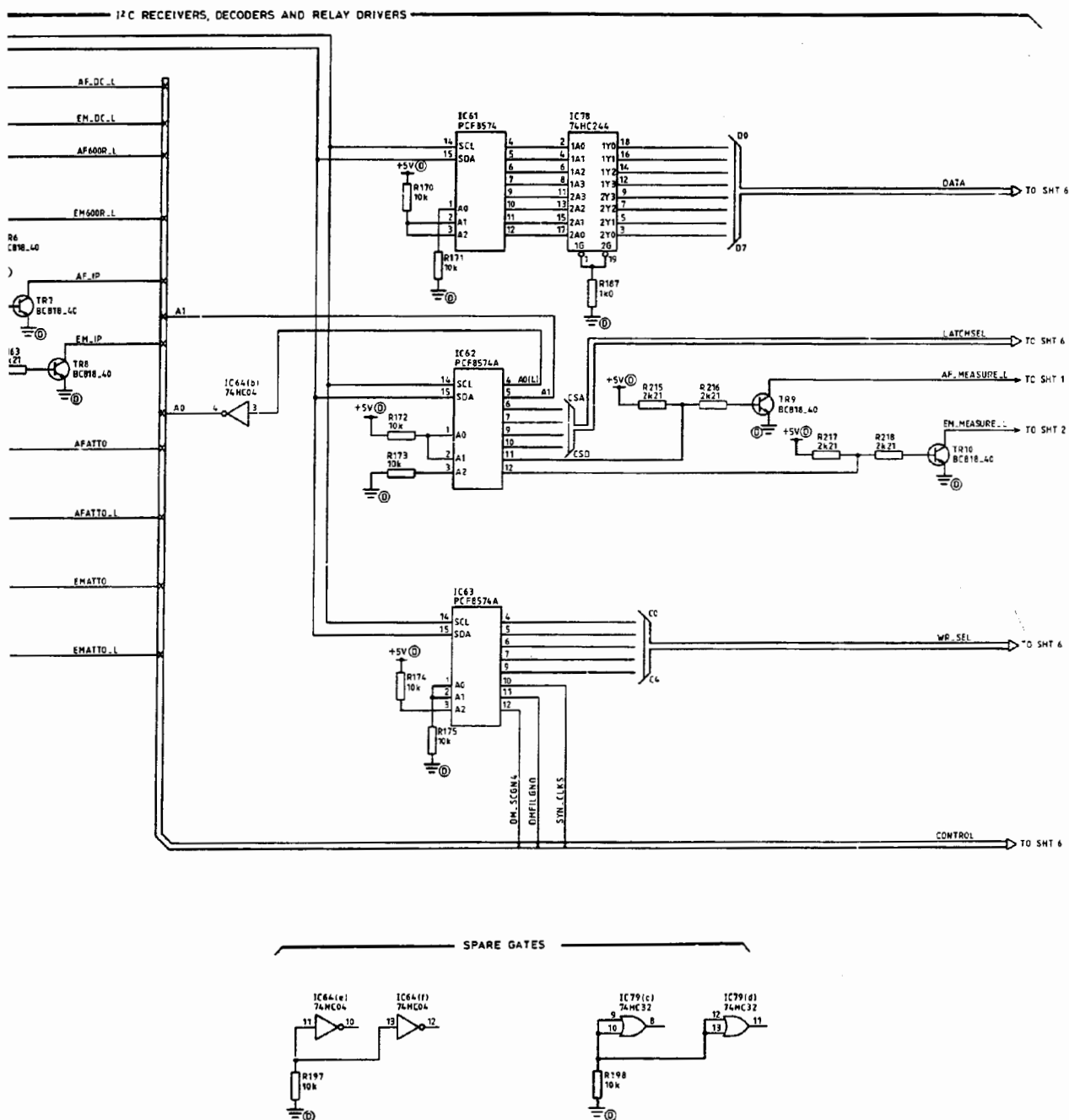
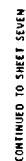
Circuit diagrams **A3**

Fig. 7-56 A3 Demodulation filters and scope attenuator - circuit

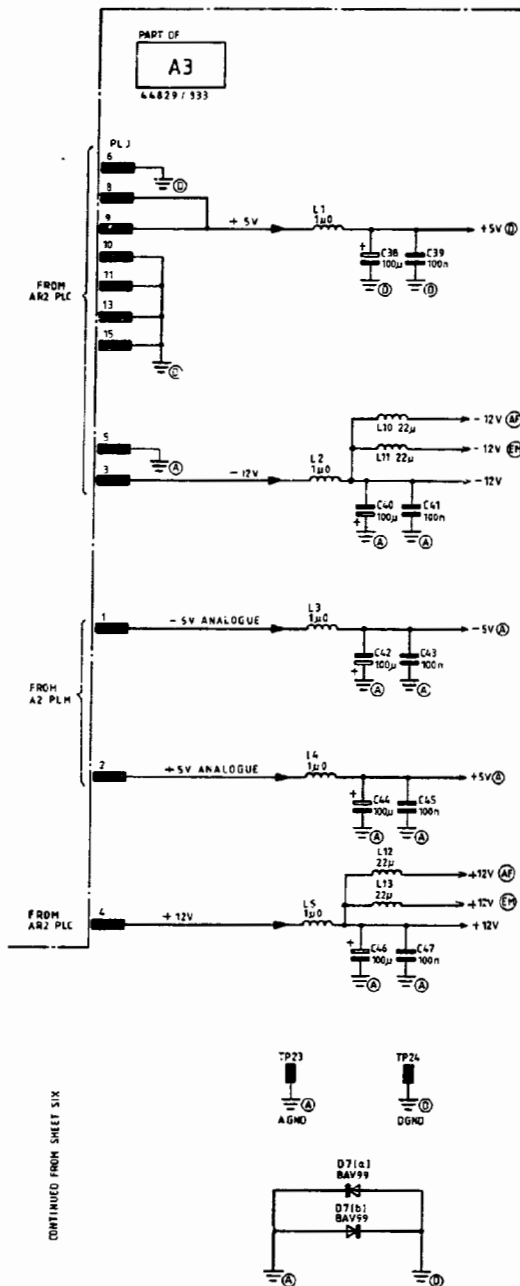


Circuit diagrams **A3**Fig. 7-57 A3 I<sup>2</sup>C receivers, decoders, and relay drivers - circuit





7-95



SUPPLY LINE TABLE									
IC	+12V (AF)	+12V (EM)	-12V (AF)	-12V (EM)	+5V A	A GND	+12V (AF)	+12V (EM)	
1	13		3				14		C190
2	7		4						C102
3	4		7		5	3			C104
4	7		4						C106
5	4		7		5	3			C108
6	7		4						C110
8	7		4						C112
10	13		3				14		C116
11	7		4						C118
12	4		7		5	3			C120
13	7		4						C122
18		7		4					C130
20		7		4					C134
21		13		3		14			C136
22		7		4					C138
23		4		7	5	3			C140
24		7		4					C142

SUPPLY LINE TABLE									
IC	+12V	-12V	+5V A	-5V A	A GND	+5V D	D GND	+12V TO AGND	-12V TO AGND
9	18	1			4		10	C114	C115
15	13	4			5			C126	C127
19	18	1			4		10	C132	C133
25	7	4						C144	C145
26	7	4	5		3			C146	C147
27	4	7	9	1	21		5	C148	C149
28			2	6	9				
29									
31	13	4			5			C156	C157
33	13	4			5			C160	C161
34	13	4			5			C162	C163
35	7	4						C164	C165
36			2	6	9				
37	13	4			5			C168	C169
38	7	4			1		5	C170	C171
39	17							C172	C173
40	5	2						C174	
41	7	4	5		3			C175	C176
42	4	7	9	1	21		5	C178	C179
43			2	6	9				
44									
46	13	4			5			C186	C187
48	13	4			5			C190	C191
49	13	4			5			C192	C193
50	7	4						C194	C195
51			2	6	9				
52	13	4			5			C196	C198
53	7	4						C200	C201
54	17				1		5	C202	
55	4	2						C203	C204
56	13	4			5			C205	C206
57	7	4			3			C207	C208
58	4	7	5					C209	C210
59						16	8		
60	3	12							
61						15	8		
62						16	8		
63						16	8		
64						14	7		
65						16	8		
66						20	10		
67						20	10		
68						16	8		
69						20	10		
70						16	8		
71						15	8		
72						20	10		
73						16	8		
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75						24	12		
76						28	14		
77						28	14		
78						20	10		
79						16	7		



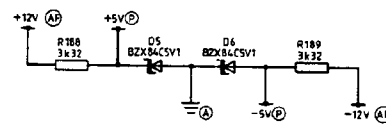
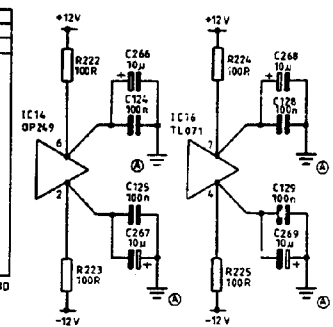
Circuit diagrams **A3**

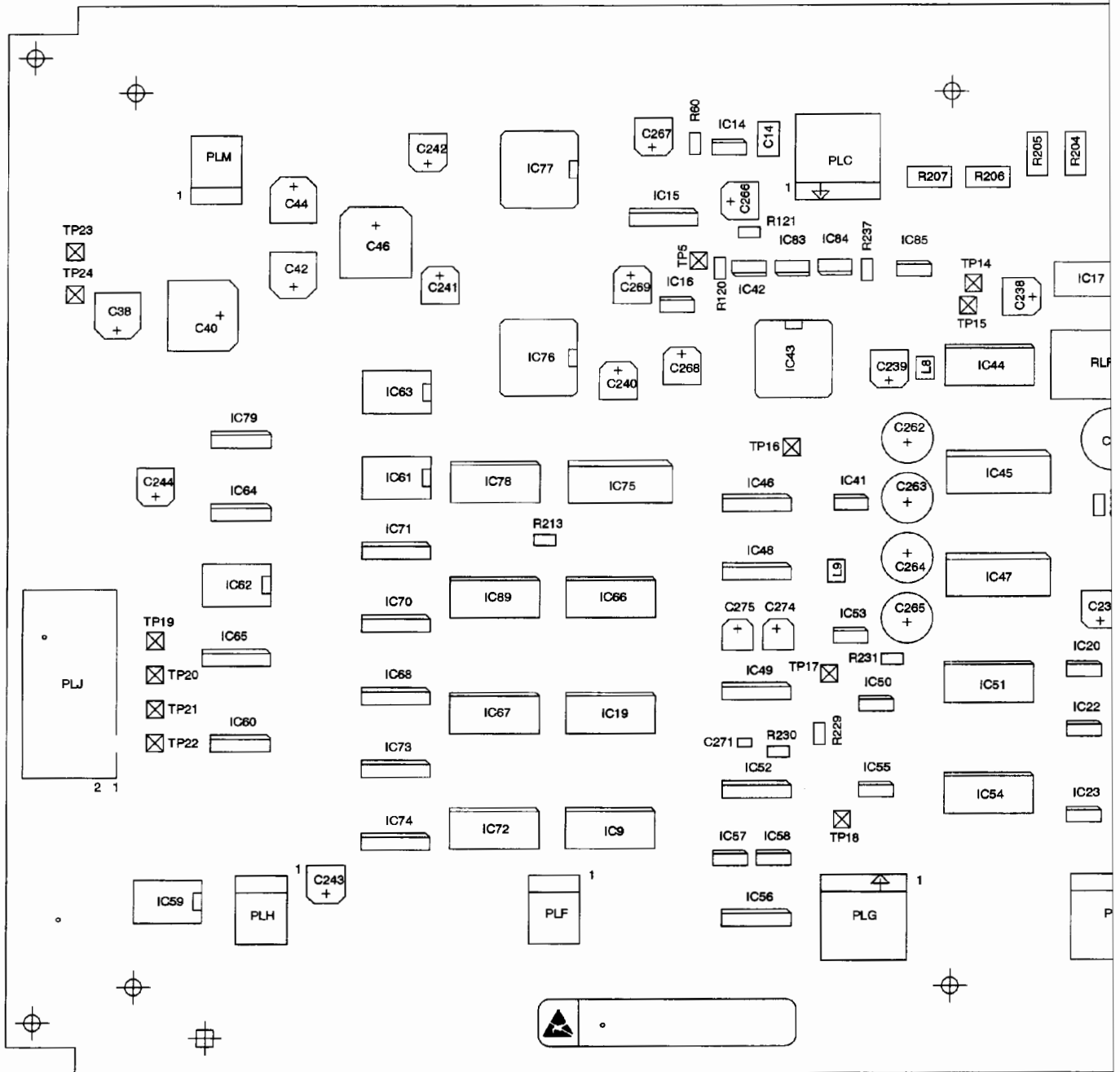
SUPPLY LINE TABLE				DECOUPLING TO AGND			
Y(AF)	-12V(EH)	+5V A	A GND	+12V (AF)	-12V (AF)	-12V (EH)	
3			14	C100		C101	
4				C102		C103	
7	5	3		C104		C105	
4				C106		C107	
7	5	3		C108		C109	
4				C110		C111	
4			14	C112		C113	
3				C116		C117	
4				C118		C119	
7	5	3		C120		C121	
4				C122		C123	
	4				C130		C131
	4				C134		C135
	3		14		C136		C137
	4				C138		C139
	7	5	3		C140		C141
	4				C142		C143

SUPPLY LINE TABLE				DECOUPLING CAPACITOR			
-5V A	A GND	+5V D	D GND	+12V TO AGND	-12V TO AGND	+5V TO AGND	-5V TO AGND
	4		10	C114	C115		
	5			C124	C127		
	4		10	C132	C133		
				C144	C145		
	3		5	C146	C147		
1	21			C148	C149		
6	9					C150	C151
	9					C152	C153
	5			C156	C157		
	5			C160	C161		
	5			C162	C163		
				C164	C165		
6	9					C166	C167
	5						
	1		5	C168	C169		
				C170	C171		
				C172	C173		
				C174			
1	3			C175	C176		
6	21			C178	C179		
	9					C180	C181
						C182	C183
	5			C186	C187		
	5			C190	C191		
	5			C192	C193		
				C194	C195		
6	9					C196	C197
	5			C198	C199		
	1		5	C200	C201		
				C202	C203		
				C204			
				C205	C206		
				C207	C208		
				C209	C210		
							C211
							C212
	16	8					C213
	16	8					C214
	16	8					C215
	14	7					C216
	16	8					C217
	20	10					C218
	20	10					C219
	16	8					C220
	20	10					C221
	20	10					C222
	16	8					C223
	20	10					C224
	20	10					C225
	16	8					C226
	24	12					C227
	28	14					C228
	28	14					C229
	20	10					C230
	16	8					C231

SUPPLY LINE TABLE				EXTRA ELECTROLYTIC DECOUPLING			
NEAR IC	5V E PIN	-VE PIN	DEC CAP				
4	+12V(AF)	AGND	C230	10 $\mu$			
4	AGND	-12V(AF)	C231	10 $\mu$			
8	+12V(AF)	AGND	C232	10 $\mu$			
8	AGND	-12V(AF)	C233	10 $\mu$			
18	+12V(EH)	AGND	C234	10 $\mu$			
18	AGND	-12V(EH)	C235	10 $\mu$			
29	+5V A	AGND	C236	10 $\mu$			
29	AGND	-5V A	C237	10 $\mu$			
43	+5V A	AGND	C238	10 $\mu$			
43	AGND	-5V A	C239	10 $\mu$			
75	+5V D	DGND	C240	10 $\mu$			
76	+5V D	DGND	C241	10 $\mu$			
77	+5V D	DGND	C242	10 $\mu$			
78	+5V D	DGND	C243	10 $\mu$			
65	+5V D	DGND	C244	10 $\mu$			

ALL IC'S DECOUPLED AT SUPPLY TO GROUND AS INDICATED

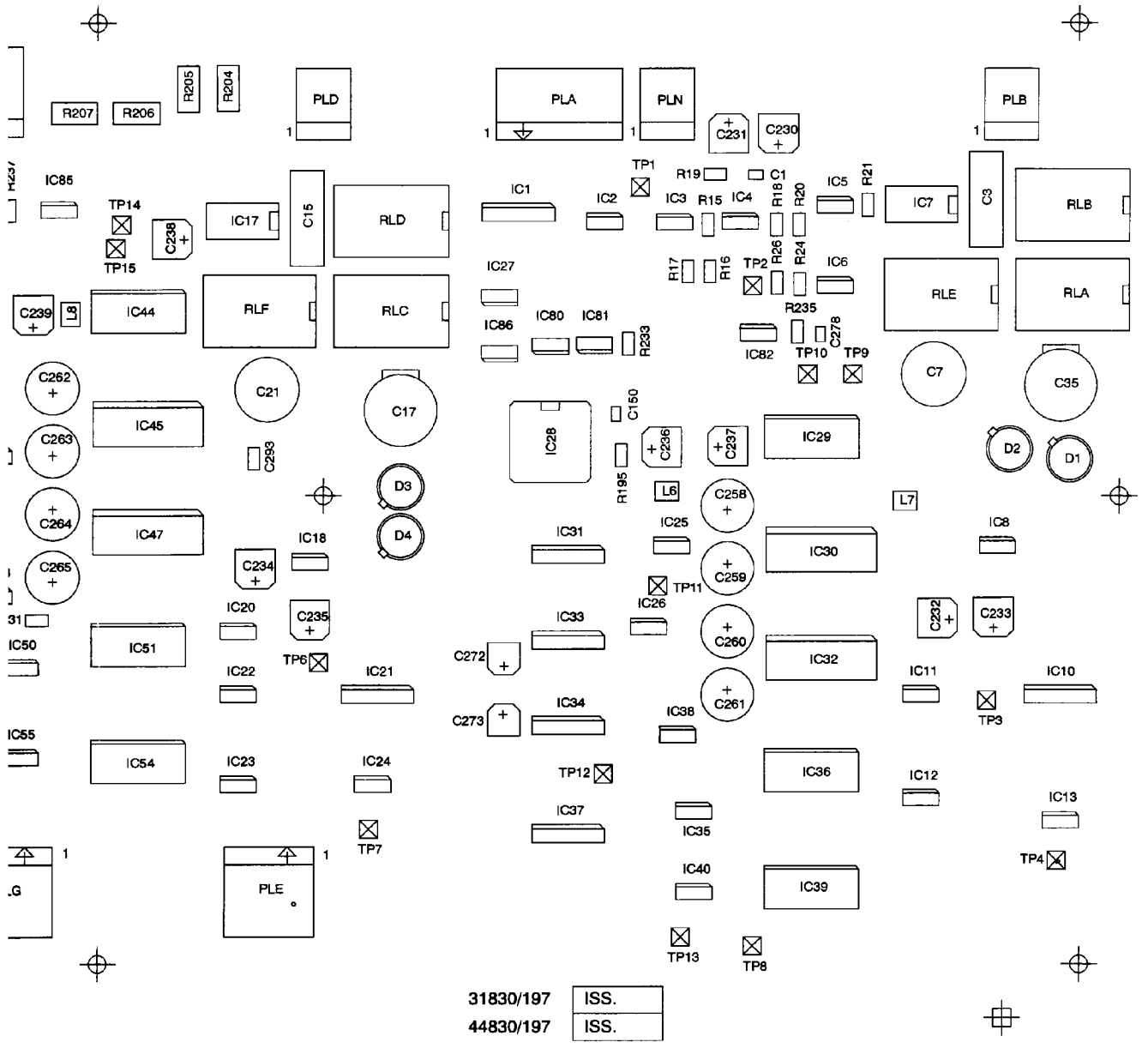


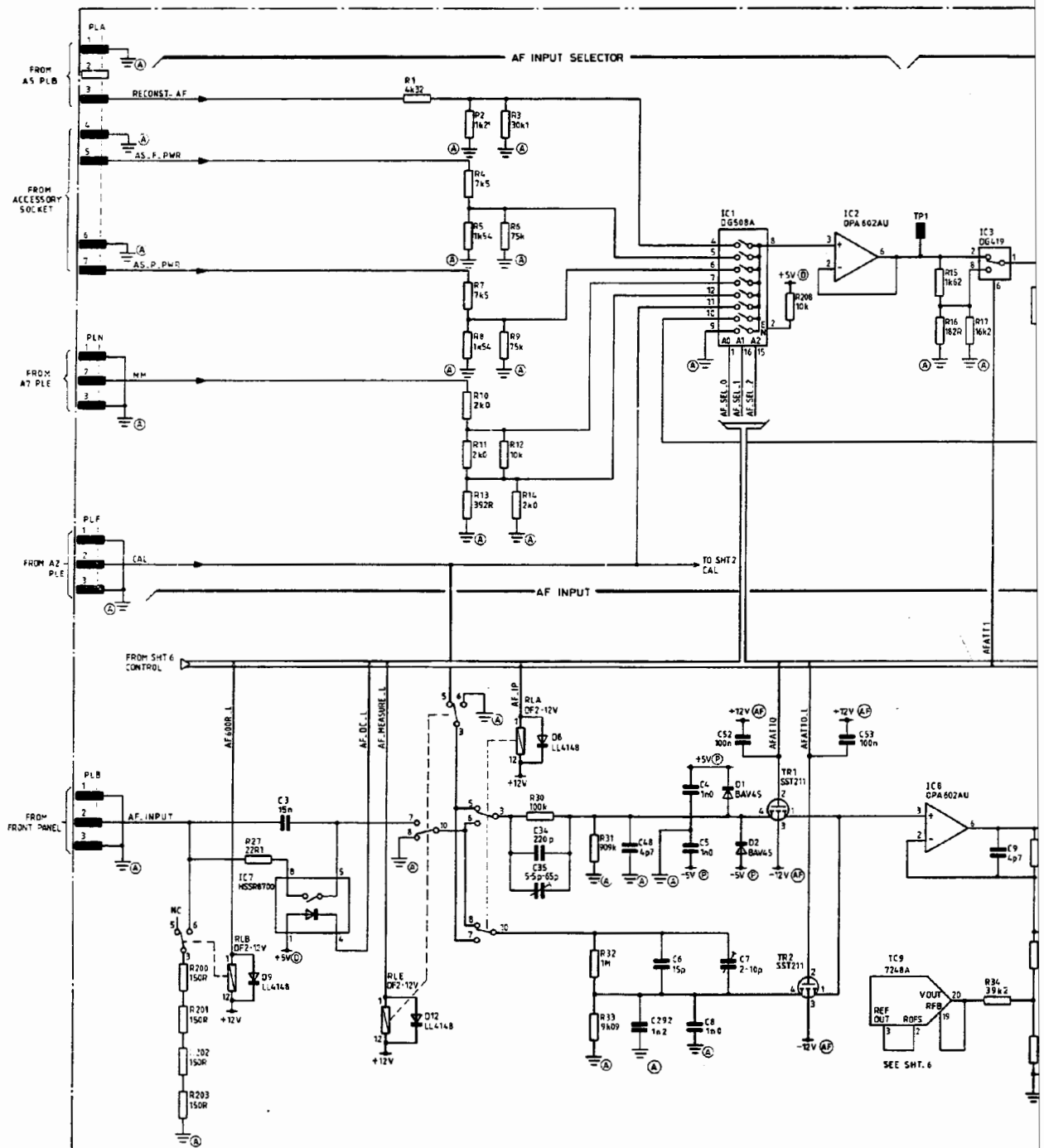


Power supply and decoupling arrangements **A3**

Drg. No. 44830/197

## Component layout **A3/1**





Circuit diagrams **A3/1**

PART OF  
**A3/1**  
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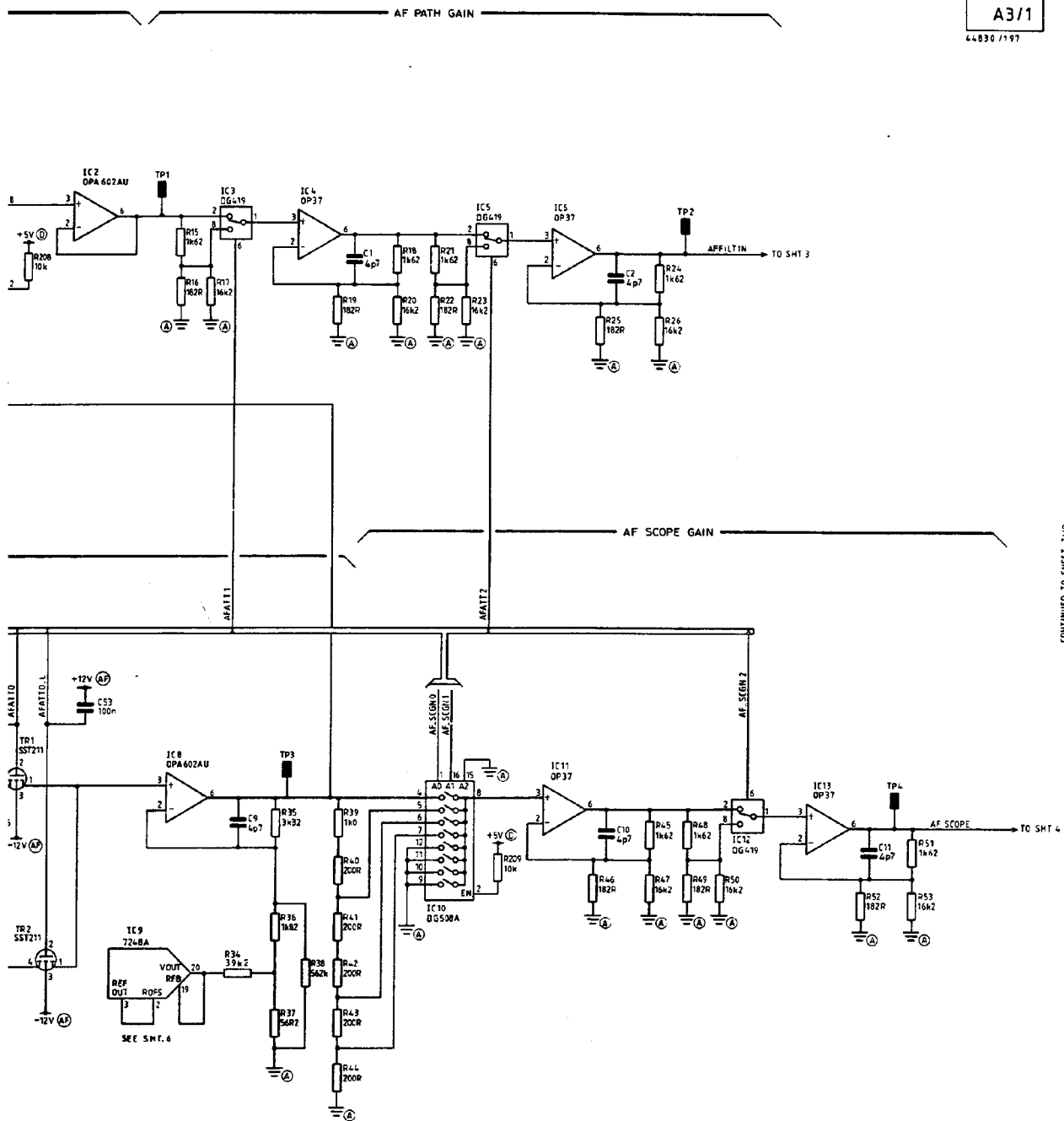
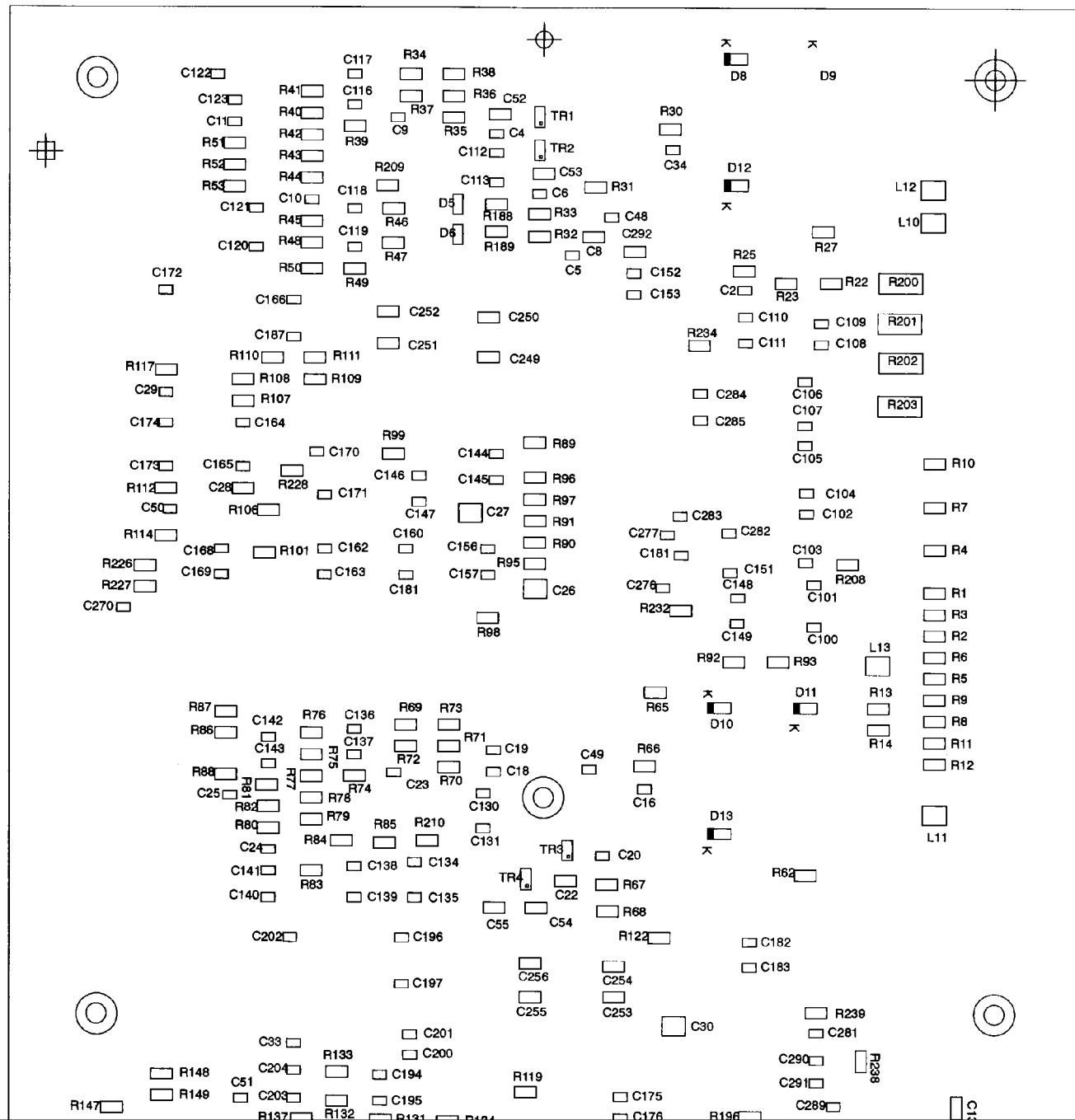
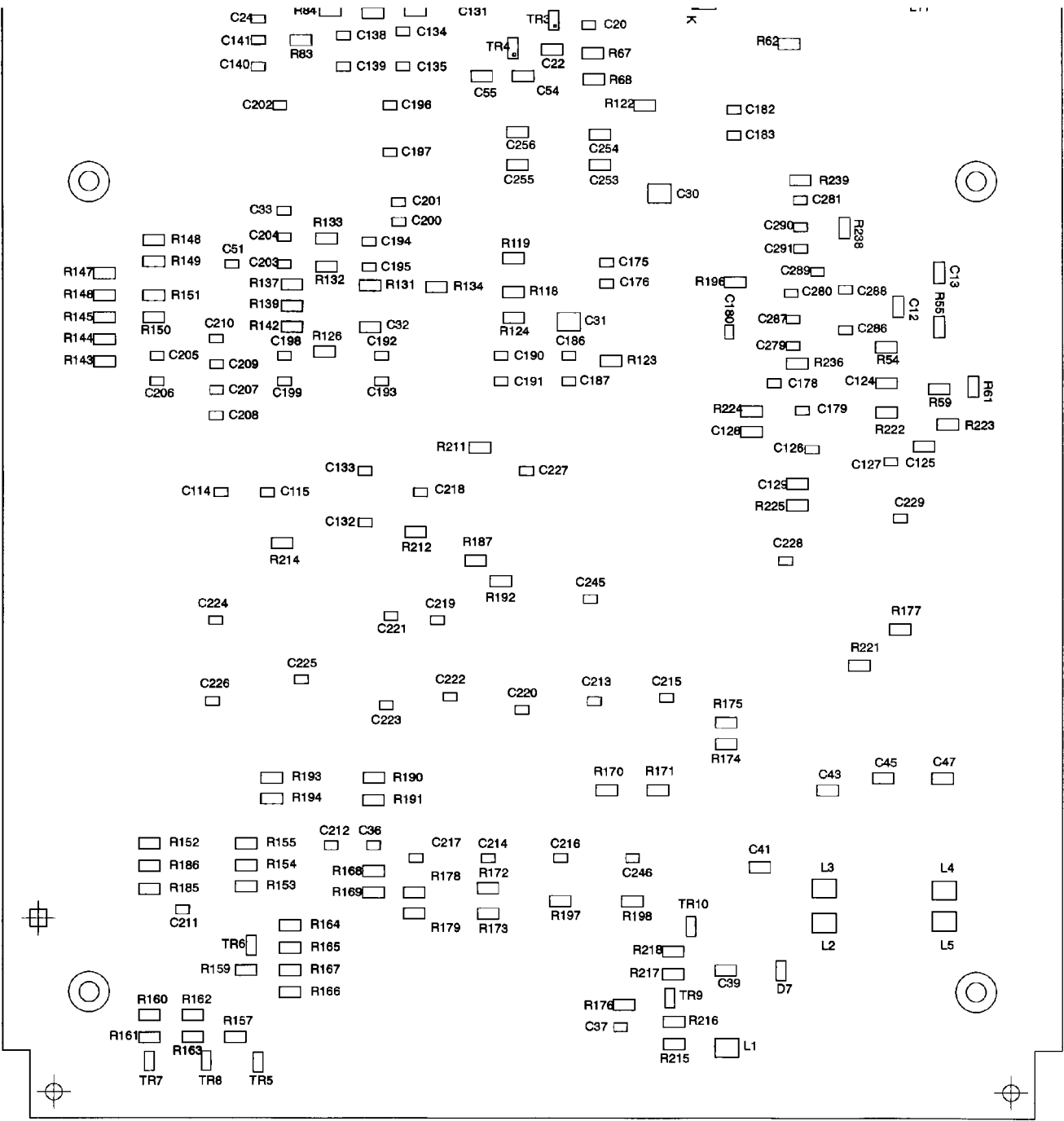


Fig. 7-61 A3/1 AF input and AF scope gain - circuit



# Component layout A3/1

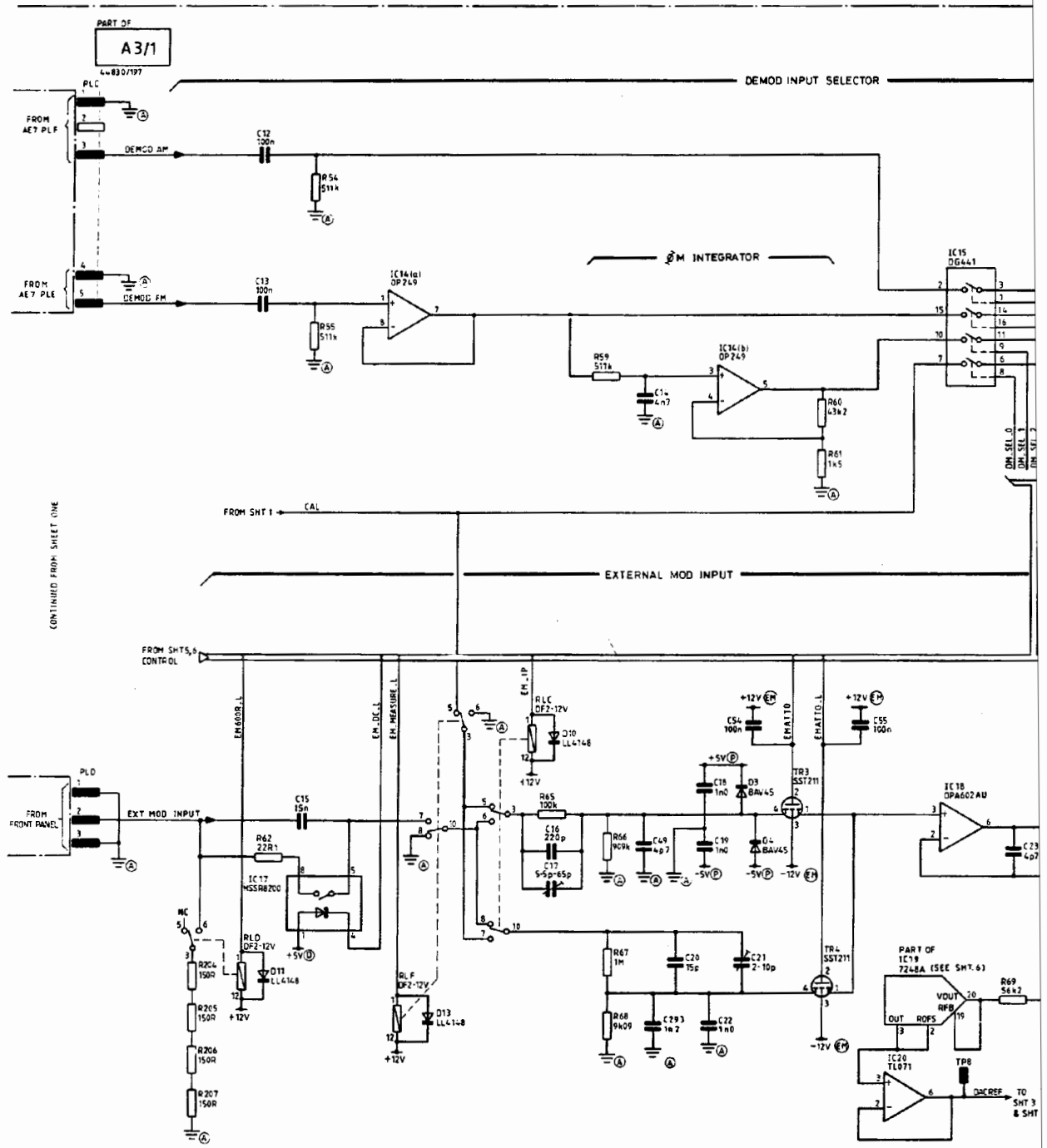


A3/1

Fig. No. 44830/197 Sheet 2 of 2 Issue 4

Fig. 7-62 A3/1 Audio processor 1 - component layout, solder side

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Circuit diagrams **A3/1**

MOD INPUT SELECTOR

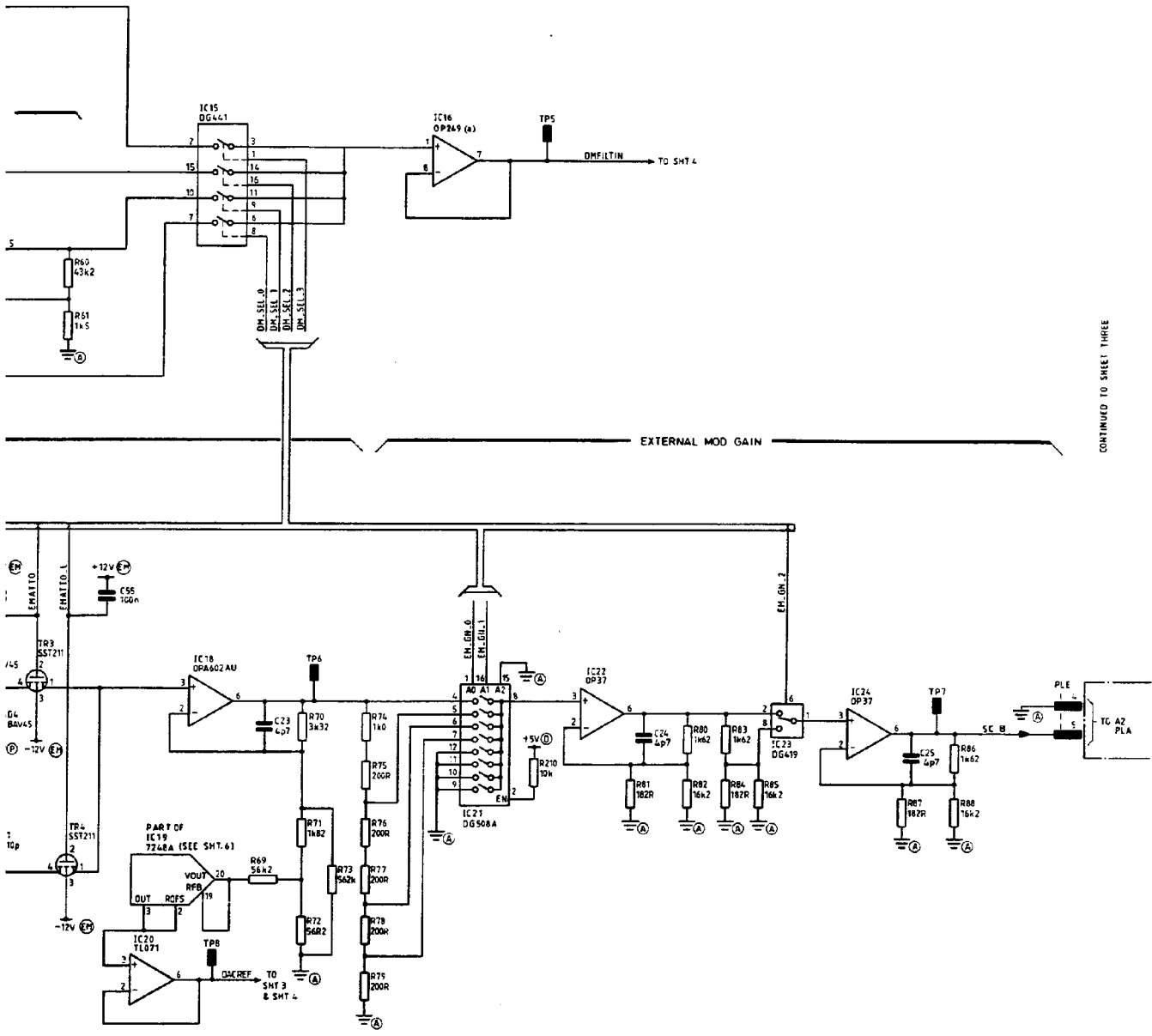
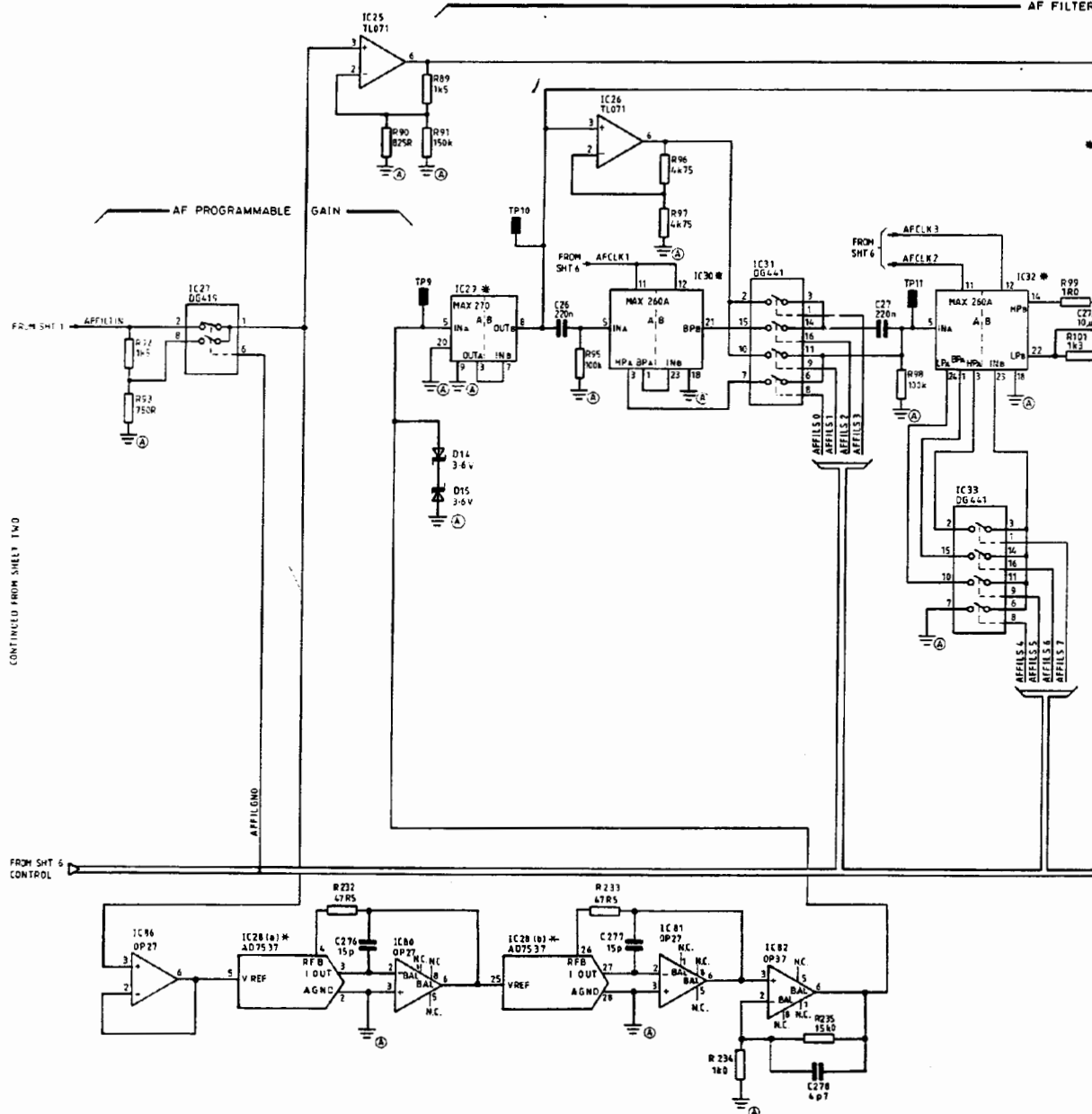


Fig. 7-63 A3/1 Demodulation input selection, ext mod input and gain - circuit

PART OF  
A3/1

- AF FILTER



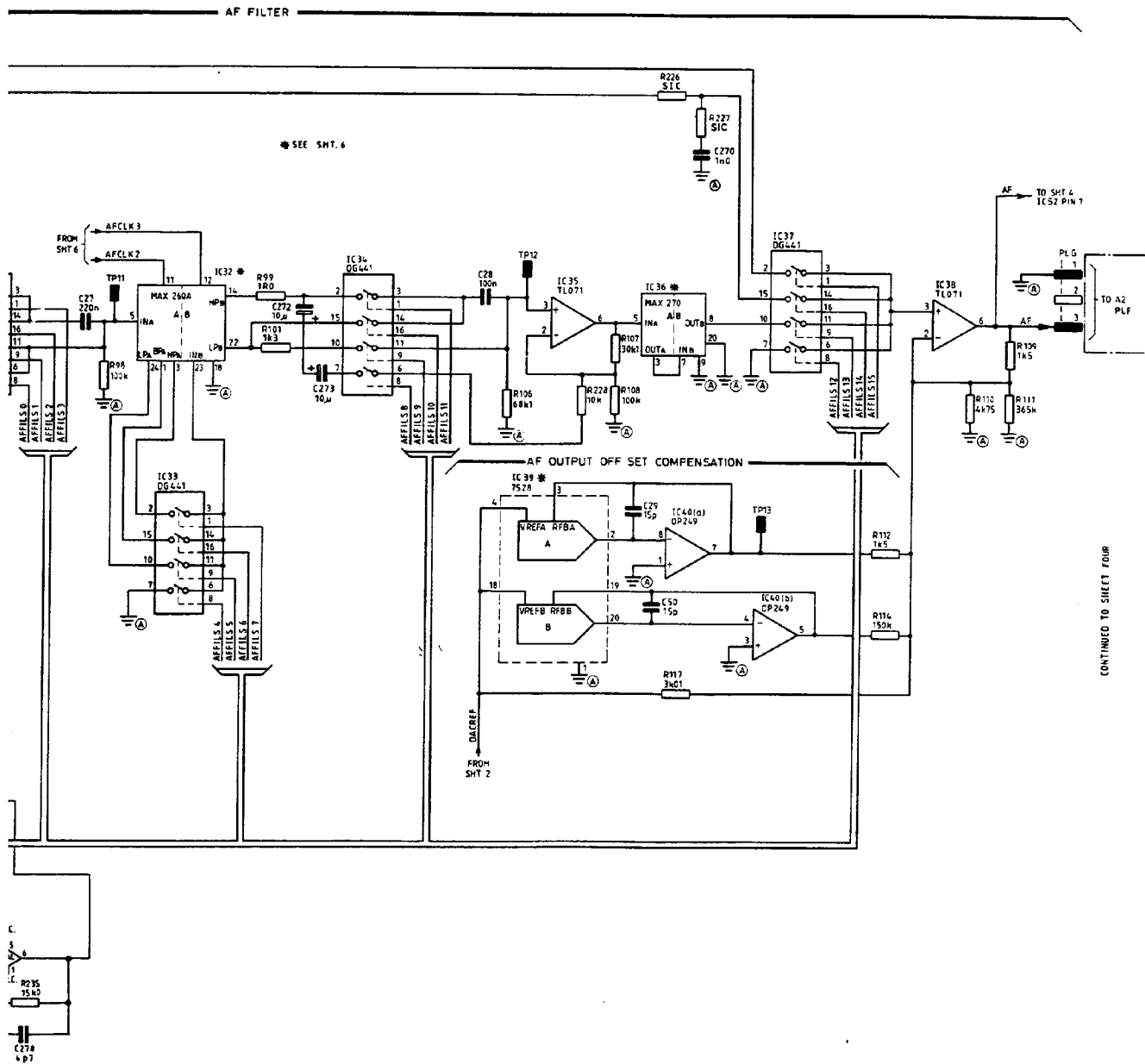
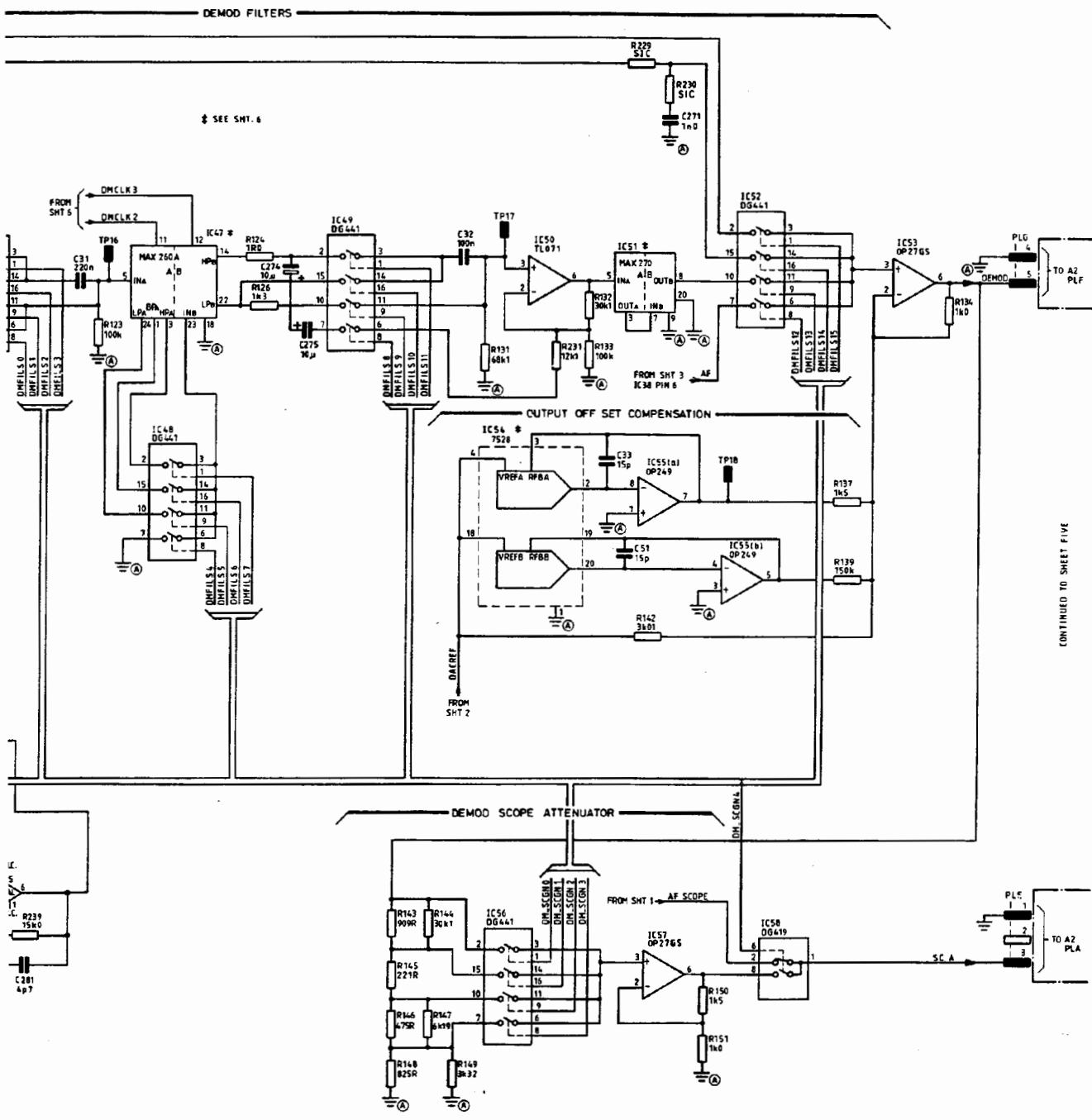
Circuit diagrams **A3/1**

Fig. 7-64 A3/1 AF filter - circuit

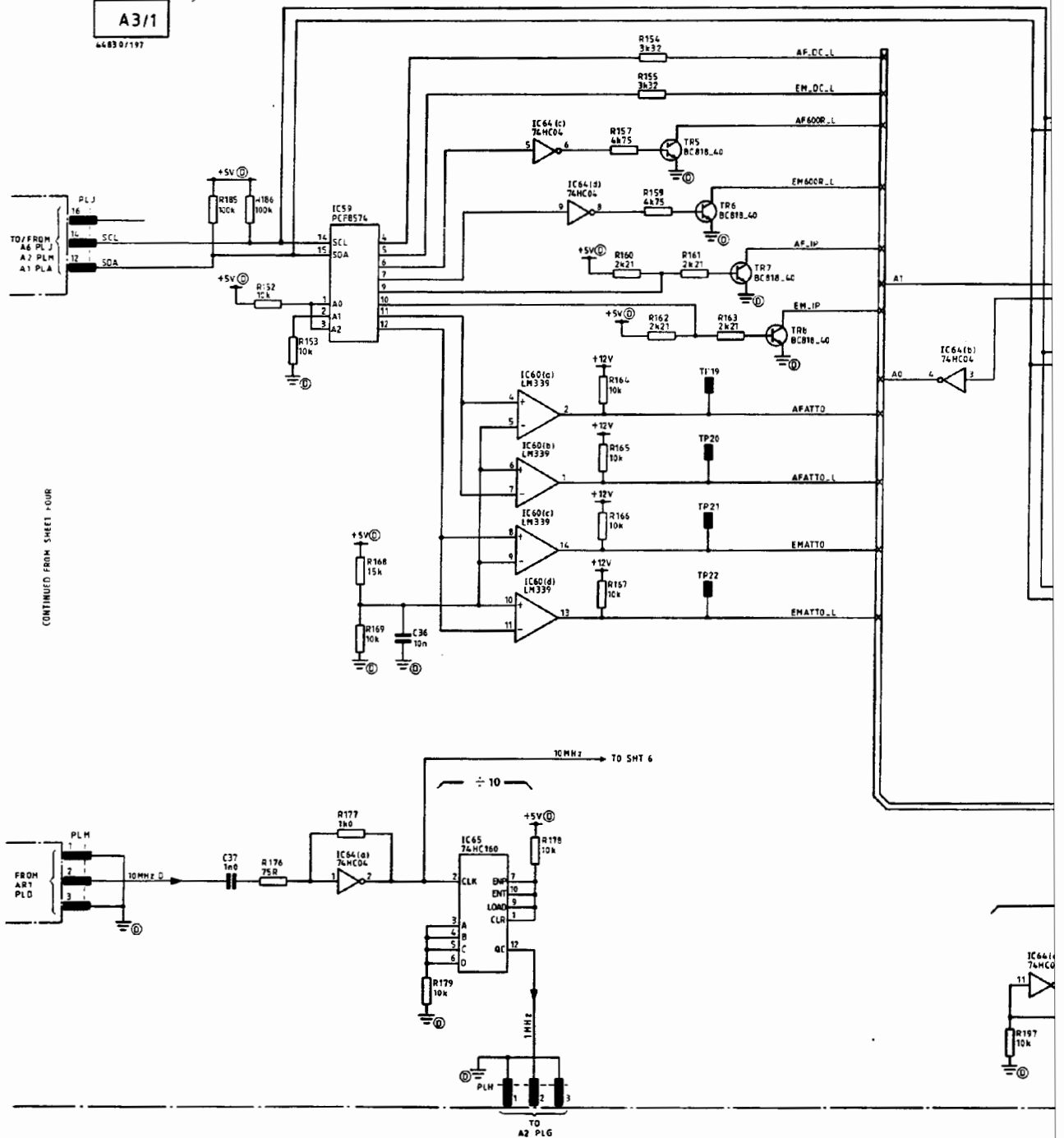


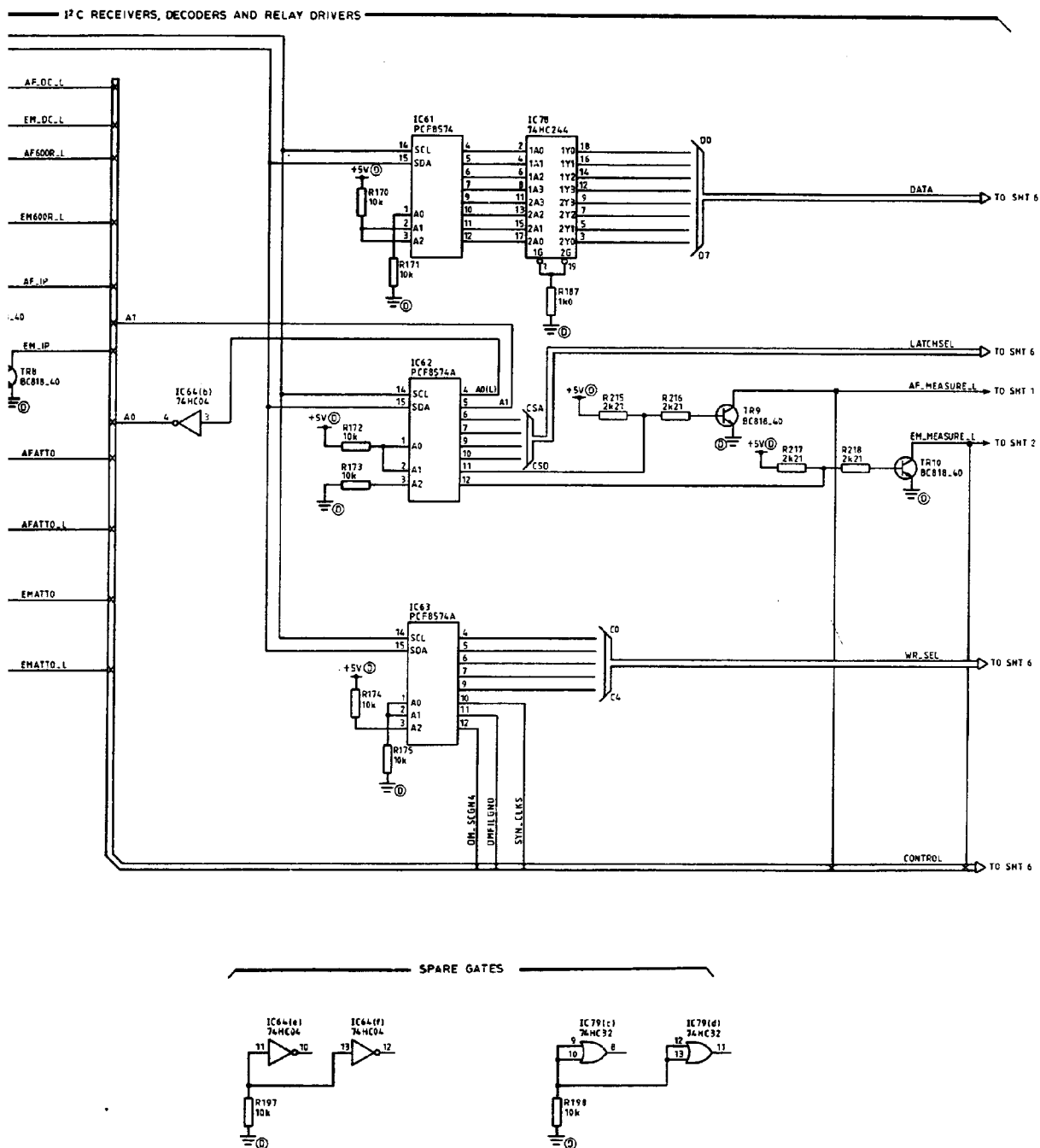
Circuit diagrams **A3/1**

PART OF

A3/1

44830/197

I<sup>2</sup>C RECEIVERS, DECODERS AND REL

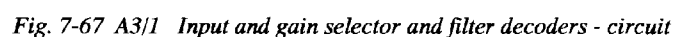
Circuit diagrams **A3/1**

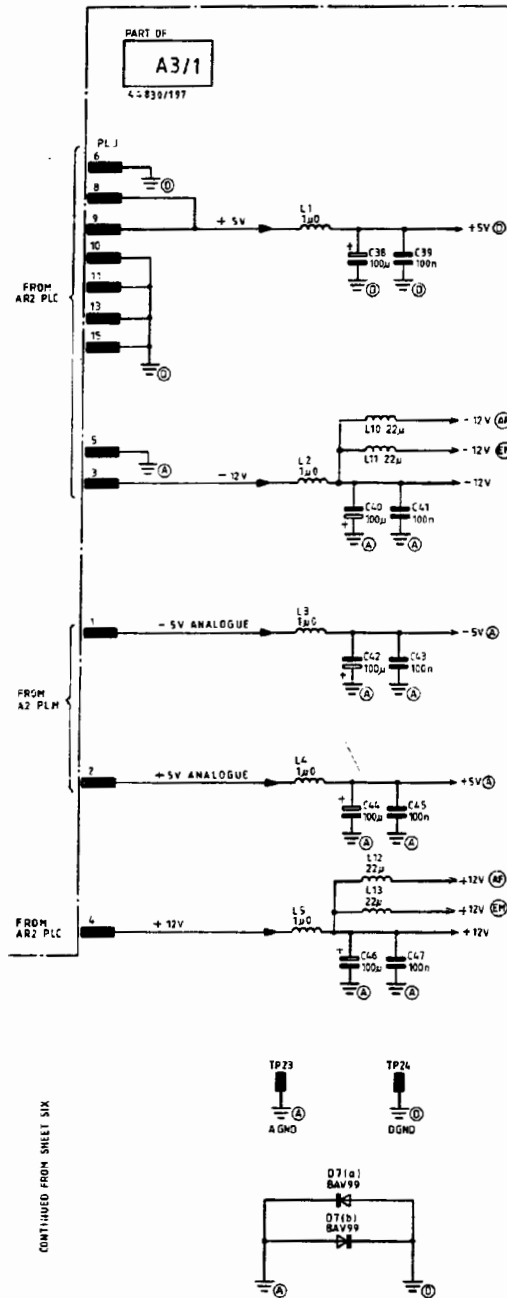
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Fig. 7-66 A3/1 I<sup>2</sup>C receivers, decoders, and relay drivers - circuit









CONTINUED FROM SHEET SIX

SUPPLY LINE TABLE										DECOUPLING TO AGND		
IC	+12V (AF)	+12V (EM)	-12V (AF)	-12V (EM)	+5V A	A GND	+12V (AF)	+12V (EM)	-12V (AF)			
1	13					14	C100					C101
2	7						C102					C103
3	4				5	3	C104					C105
4	7						C106					C107
5	4				5	3	C108					C109
6	7						C110					C111
8	7						C112					C113
10	13					14	C116					C117
11	7						C118					C119
12	4				5	3	C120					C121
13							C122					C123
18	7										C130	
20											C134	
21											C136	
22						14					C138	
23												
24					5	3					C140	
											C142	

SUPPLY LINE TABLE										DECOUPLING TO AGND		
IC	+12V	-12V	+5V A	-5V A	A GND	+5V D	D GND	+12V TO AGND	-12V TO AGND	+5V TO A		
9	18	1			4		10	C114	C115			
15	13	4			5			C126	C127			
16	18	1					10	C132	C133			
25	7	4						C144	C145			
26	7	4			3			C146	C147			
27	4	7	5					C148	C149			
28	26						14	C150				
29			2	6	9							C152
31	13	4			5			C156	C157			
33	13	4			5			C160	C161			
34	13	4			5			C162	C163			
35	7	4						C164	C165			
36												
37	13	4	2	6	9			C168	C169			C166
38	7	4			5			C170	C171			
39	17				1		5	C172				
40	6	2						C173	C174			
41	7	4			3			C175	C176			
42	4	7	5					C178	C179			
43								C180				
44	24		2	6	9		14					C182
46	13	4			5			C186	C187			
48	13	4			5			C190	C191			
49	13	4			5			C192	C193			
50	7	4						C194	C195			
51												
52	13	4	2	6	9			C196	C199			C198
53	7	4			5			C200	C201			
54	17				1		5	C202				
55	6	2						C203	C204			
56	13	4			5			C205	C206			
57	7	4						C207	C208			
58	4	7	5		3			C209	C210			
59												
60	3	12				16	8					
61						16	8					
62						16	8					
63						16	8					
64						14	7					
65						16	8					
66						20	10					
67						20	10					
68						16	8					
69						20	10					
70						16	8					
71						16	8					
72						20	10					
73						16	8					
74						16	8					
75						24	12					
76						28	14					
77						28	14					
78						20	10					
79						14	7					
80	7	4						C151	C181			
81	7	4						C282	C283			
82	7	4						C284	C285			
83	7	4						C286	C287			
84	7	4						C288	C289			
85	7	4						C290	C291			
86	7	4										

Circuit diagrams **A3/1**

SUPPLY LINE TABLE					
V(EM)	+5V A	A GND	DECOUPLING TO AGND		
			+12V (AF)	+12V (EM)	-12V (AF)
4		14	C100		C101
5	3		C102		C103
			C104		C105
5	3		C106		C107
			C108		C109
		14	C110		C111
			C112		C113
			C116		C117
			C118		C119
			C120		C121
4			C122		C123
4				C130	C131
3				C134	C135
4				C136	C137
				C138	C139
7	5	3		C140	C141
4				C142	C143

SUPPLY LINE TABLE									
GND	+5V D	DGND	DECOUPLING CAPACITOR						
			+12V TO AGND	-12V TO AGND	+5V TO AGND	-5V TO AGND	+5V TO DGND	+12V TO -12V	
4		10	C114	C115					
5		10	C126	C127					
4			C132	C133					
			C144	C145					
3		14	C146	C147					
			C148	C149					
9			C150		C152	C153			
5			C156	C157					
5			C160	C161					
5			C162	C163					
			C164	C165					
9			C168	C169	C166	C167			
1		5	C170	C171					
			C172	C173					
			C174						
3		14	C175	C176					
			C178	C179					
			C180		C182	C183			
			C186	C187					
			C190	C191					
			C192	C193					
			C194	C195					
			C198	C199	C196	C197			
		5	C200	C201					
			C202	C204					
			C203	C206					
			C205	C208					
16	8		C207	C210			C211		
			C209					C212	
16	8						C213		
16	8						C214		
16	8						C215		
14	7						C216		
20	10						C217		
20	10						C218		
16	8						C221		
20	10						C223		
15	8						C219		
							C222		
16	8						C220		
20	10						C224		
16	8						C225		
16	8						C226		
24	12						C227		
28	14						C228		
28	14						C229		
20	10						C245		
14	7						C246		
			C251	C281					
			C282	C283					
			C284	C285					
			C286	C287					
			C288	C289					
			C290	C291					

SUPPLY LINE TABLE					
NEAR IC	+VE PIN	-VE PIN	EXTRA ELECTROLYTIC DECOUPLING		
			DEC	CAP	
4	+12V(AF)	AGND	C230	10μ	
4	AGND	-12V(AF)	C231	10μ	
8	+12V(AF)	AGND	C232	10μ	
8	AGND	-12V(AF)	C233	10μ	
18	+12V(EM)	AGND	C234	10μ	
18	AGND	-12V(EM)	C235	10μ	
29	+5V A	AGND	C236	10μ	
29	AGND	-5V A	C237	10μ	
44	+5V A	AGND	C238	10μ	
44	AGND	-5V A	C239	10μ	
75	+5V D	DGND	C240	10μ	
76	+5V D	DGND	C241	10μ	
77	+5V D	DGND	C242	10μ	
78	+5V D	DGND	C243	10μ	
65	+5V D	DGND	C244	10μ	

ALL IC'S DECOUPLED AT SUPPLY TO GROUND AS INDICATED

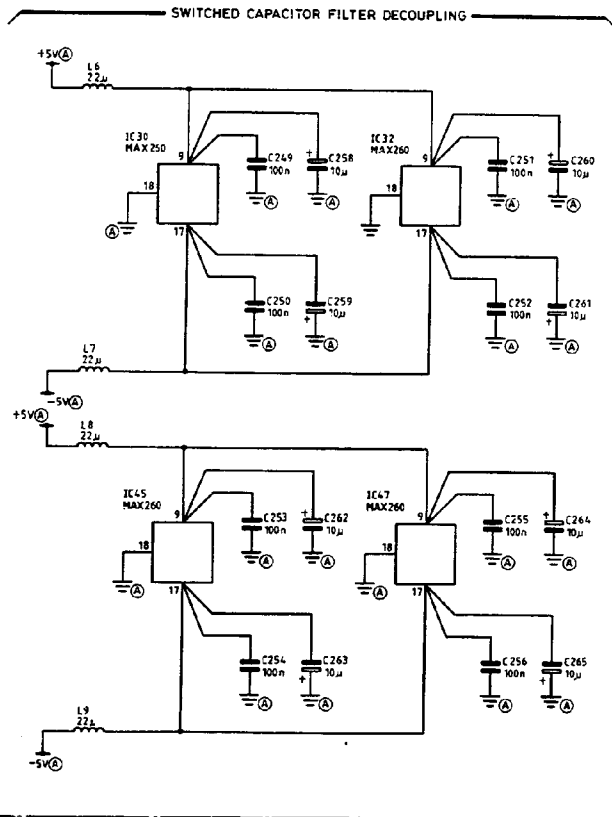
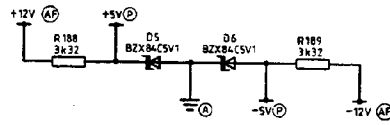
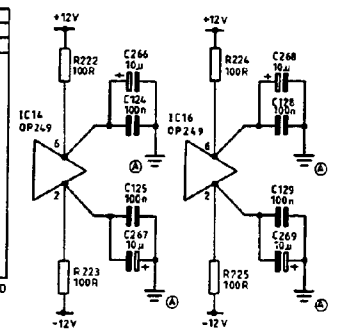
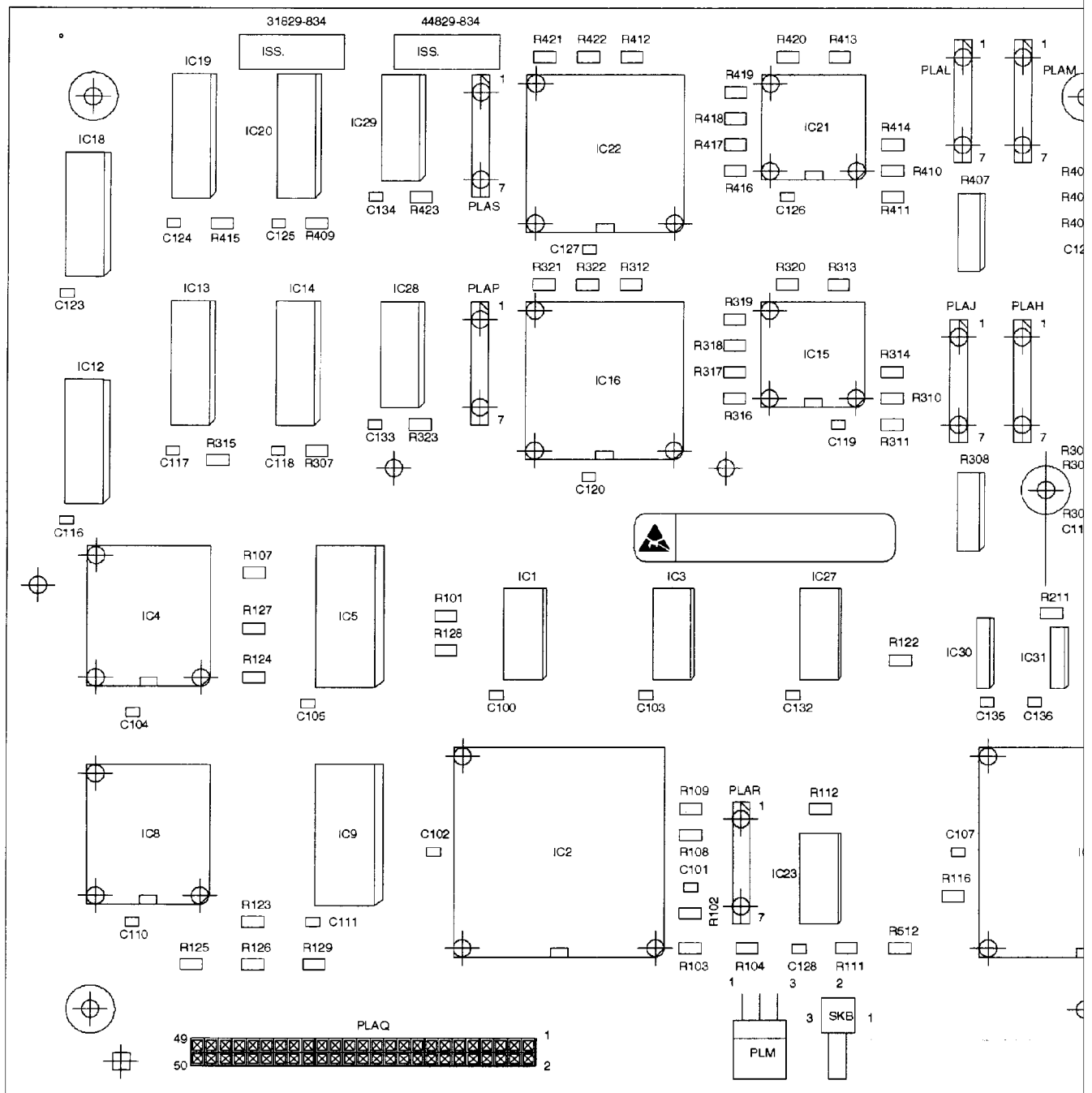


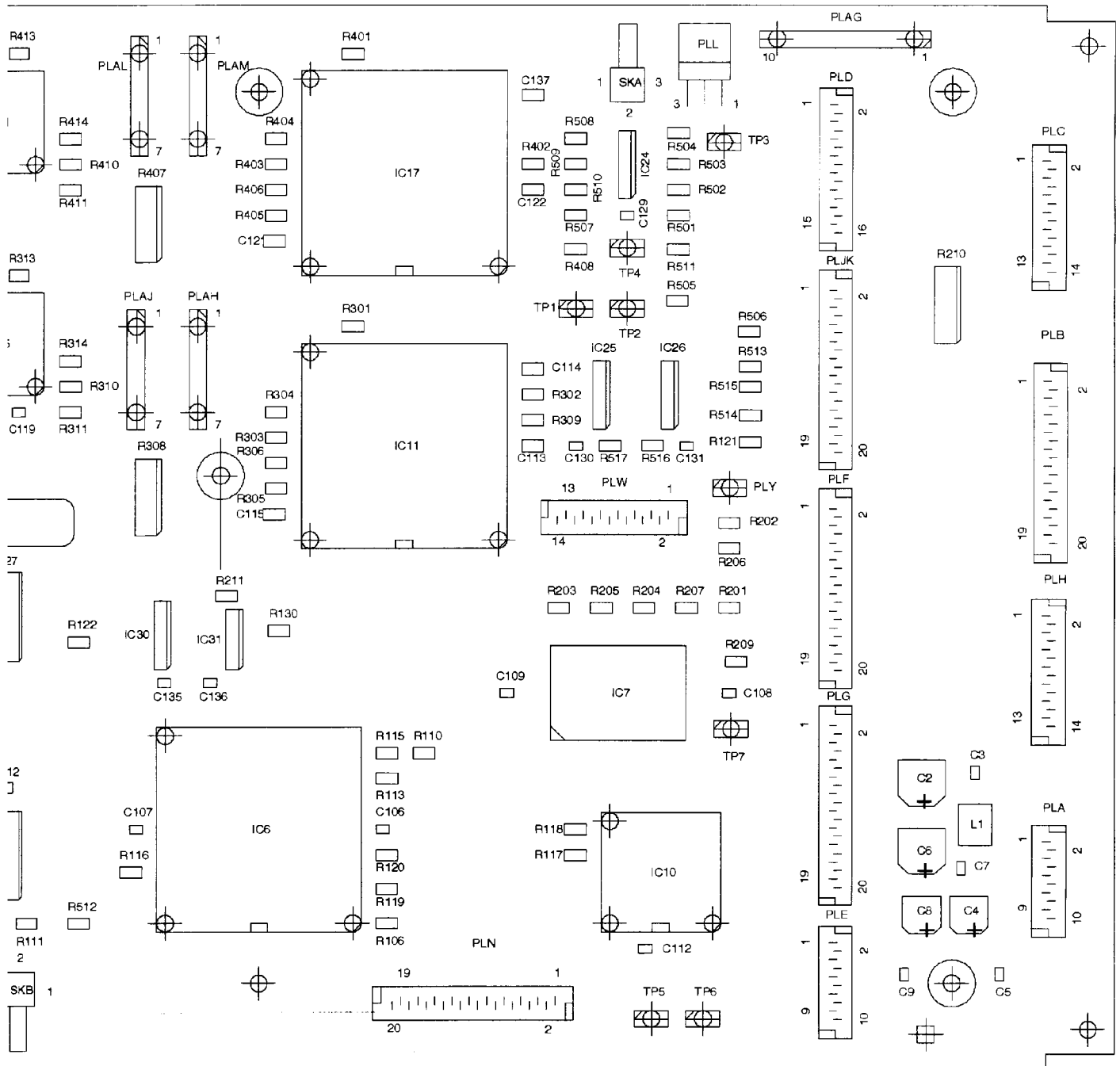
Fig. 7-68 A3/1 Power supply and decoupling arrangements - circuit



Power supply and decoupling arrangements **A3/1**

Drg. No. 44829/6

# Component layout **A4**

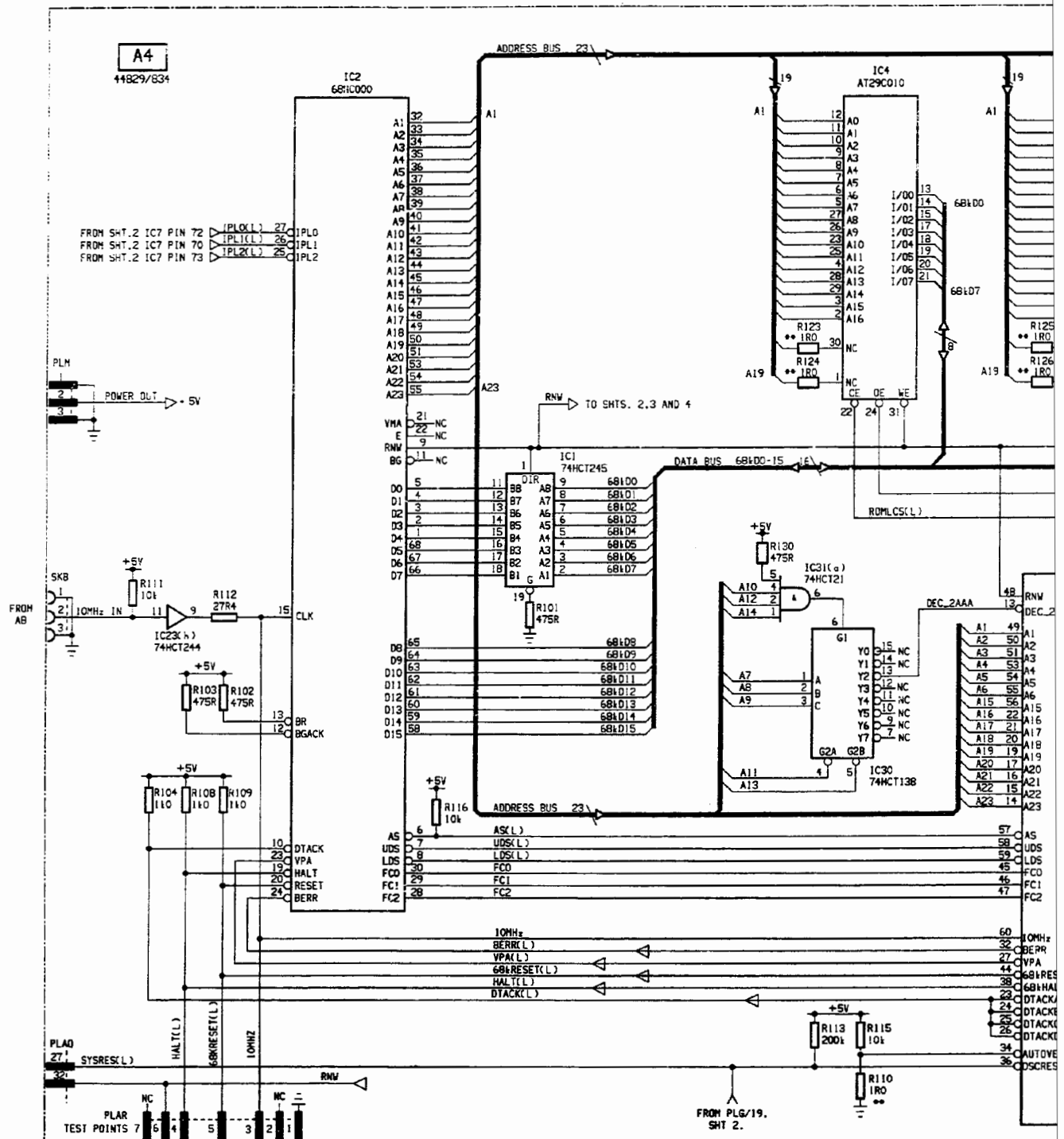


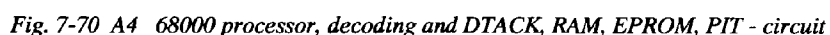
**A3/1**

Drg. No. 44829/834 Sheet 1 of 1 Issue 4

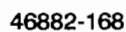
Fig. 7-69 A4 Hot processor 1 - component layout

46882-168





TO/FROM AB (LCA CON





J/FROM A8 (LCA CONFIG PORT)

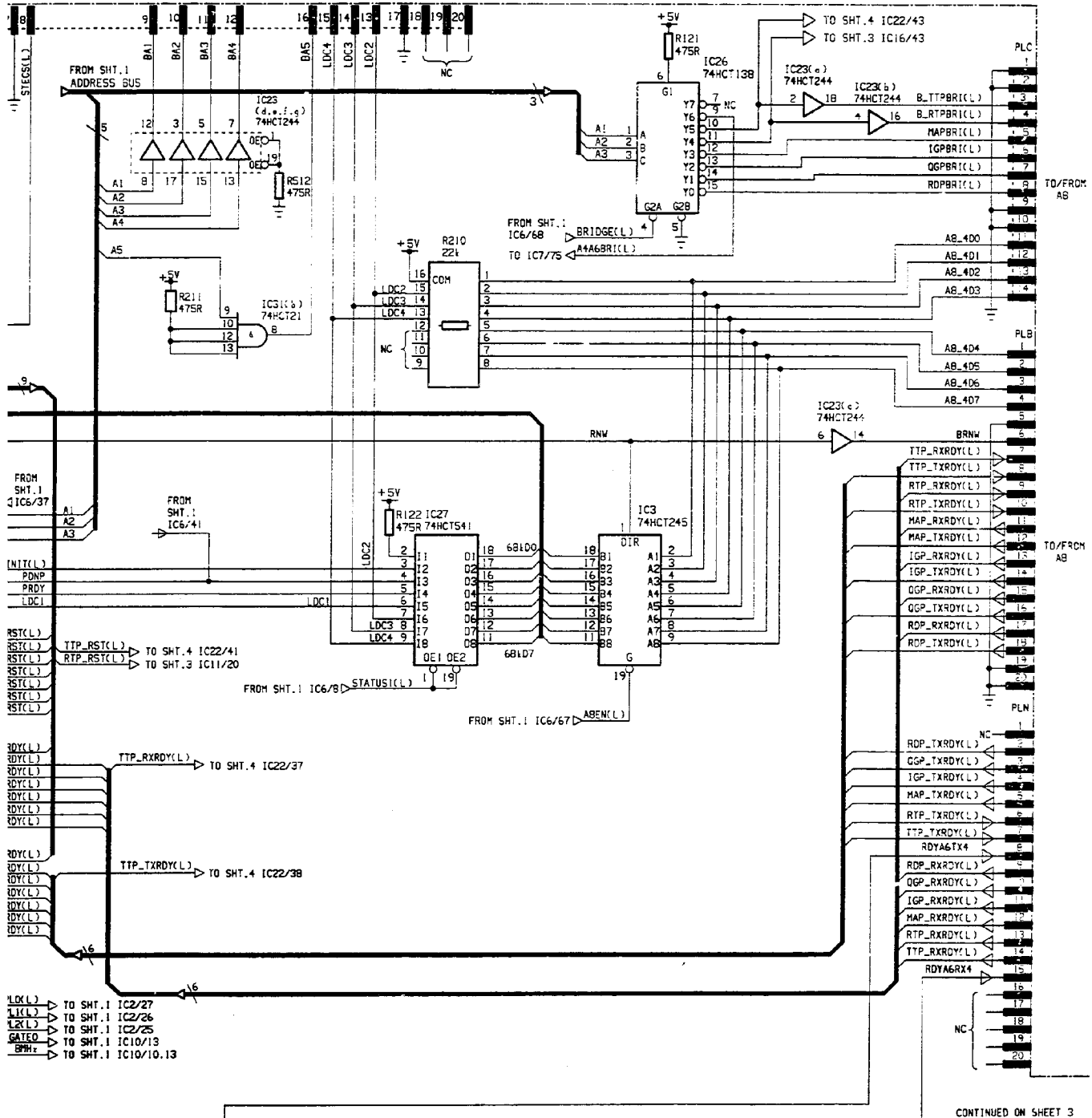
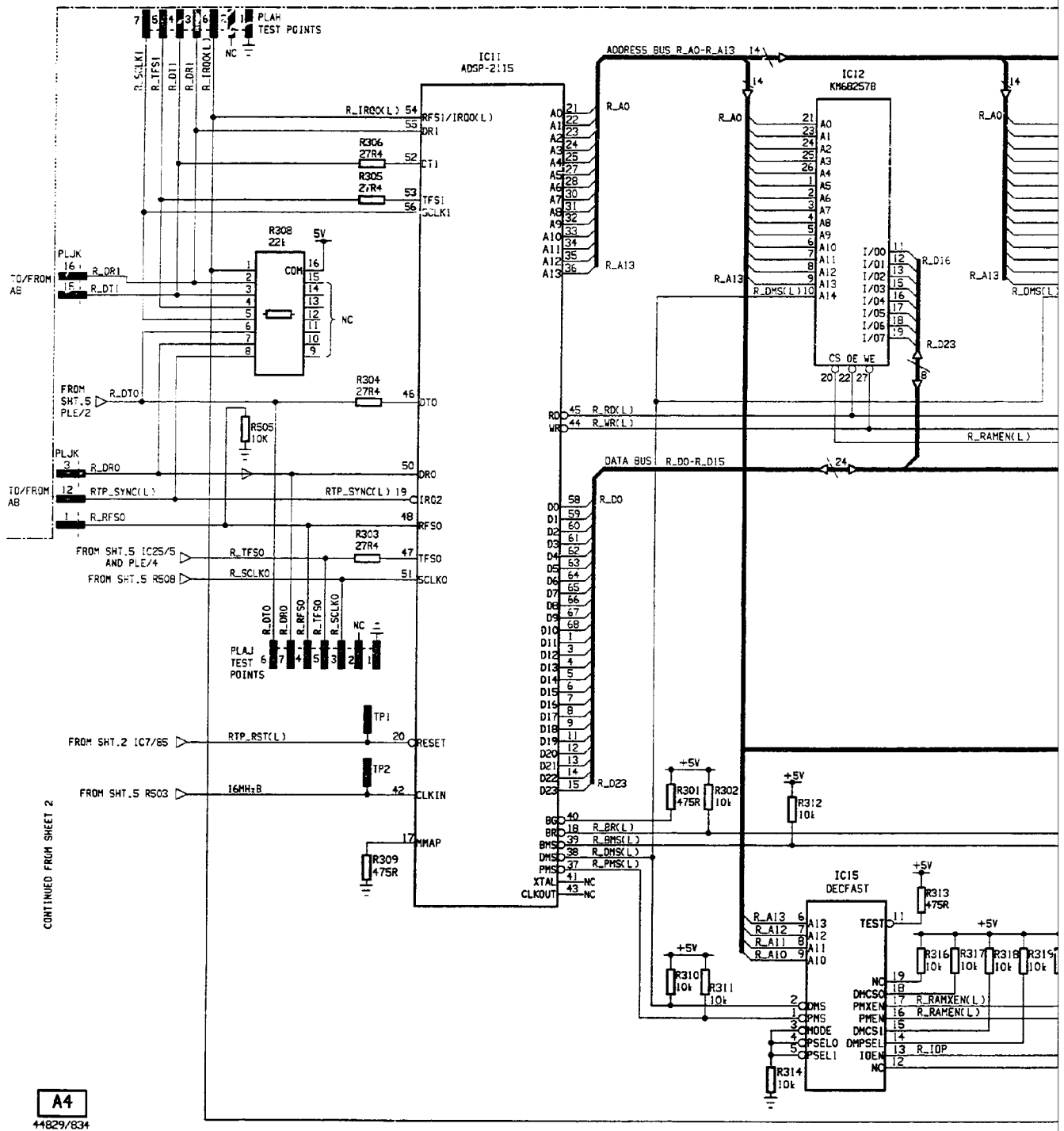
Circuit diagrams **A4**

Fig. 7-71 A4 PPH - A8 interface - circuit



Circuit diagrams **A4**

NOTE: RESISTORS MARKED \*\* ARE NOT FITTED AT PRESENT.

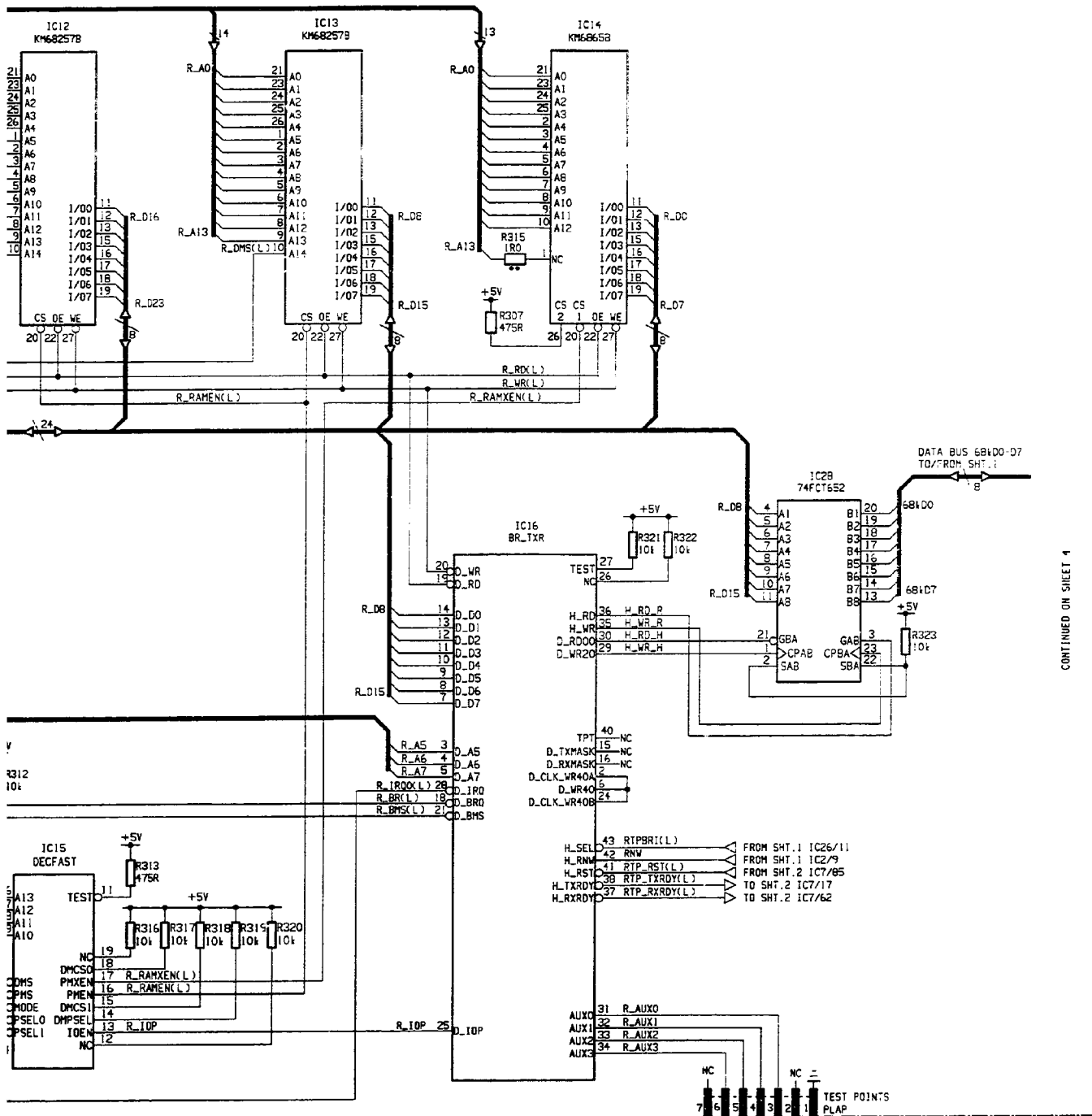
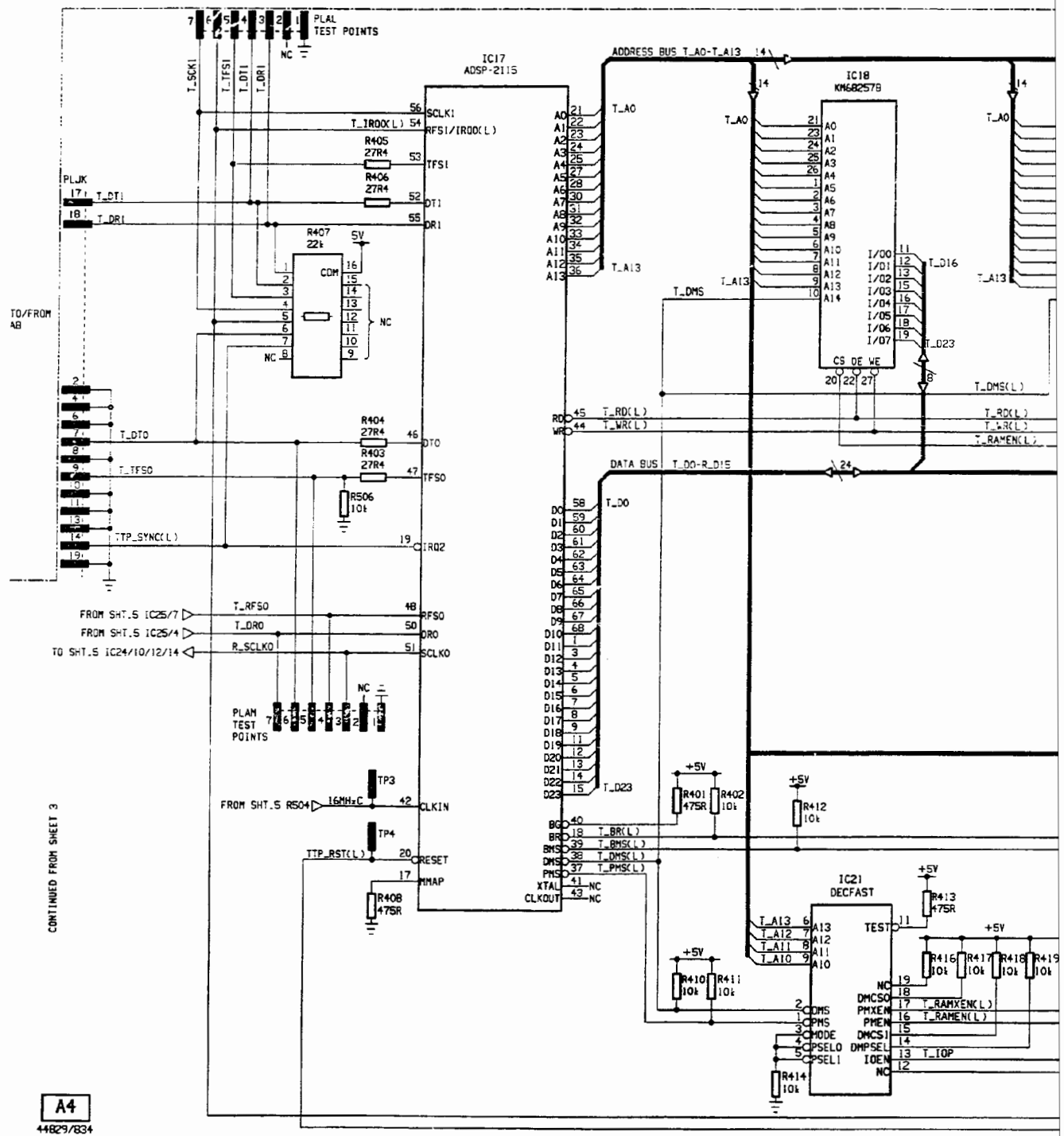
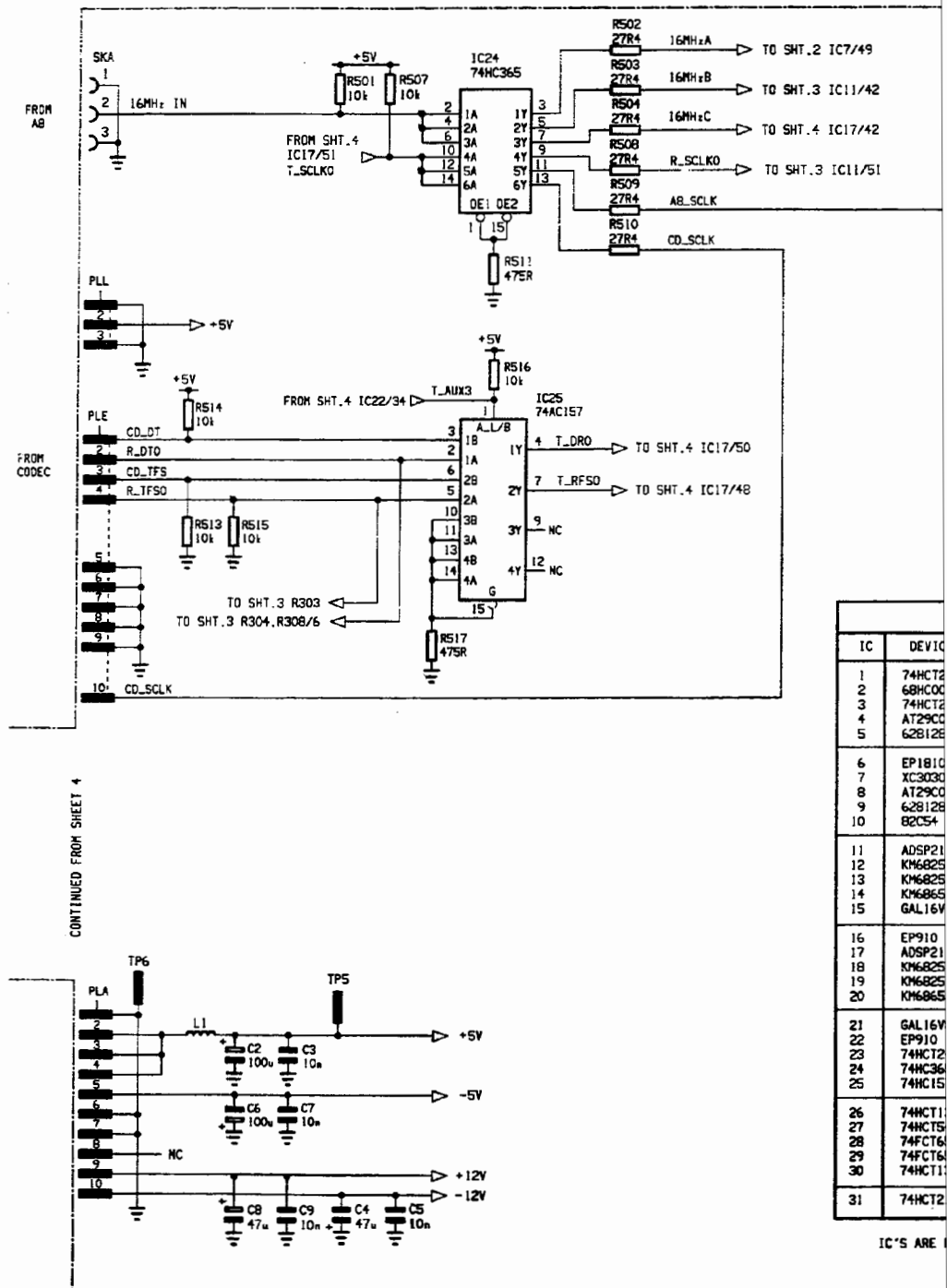


Fig. 7-72 A4 Receive (uplink) traffic processor DSP - circuit







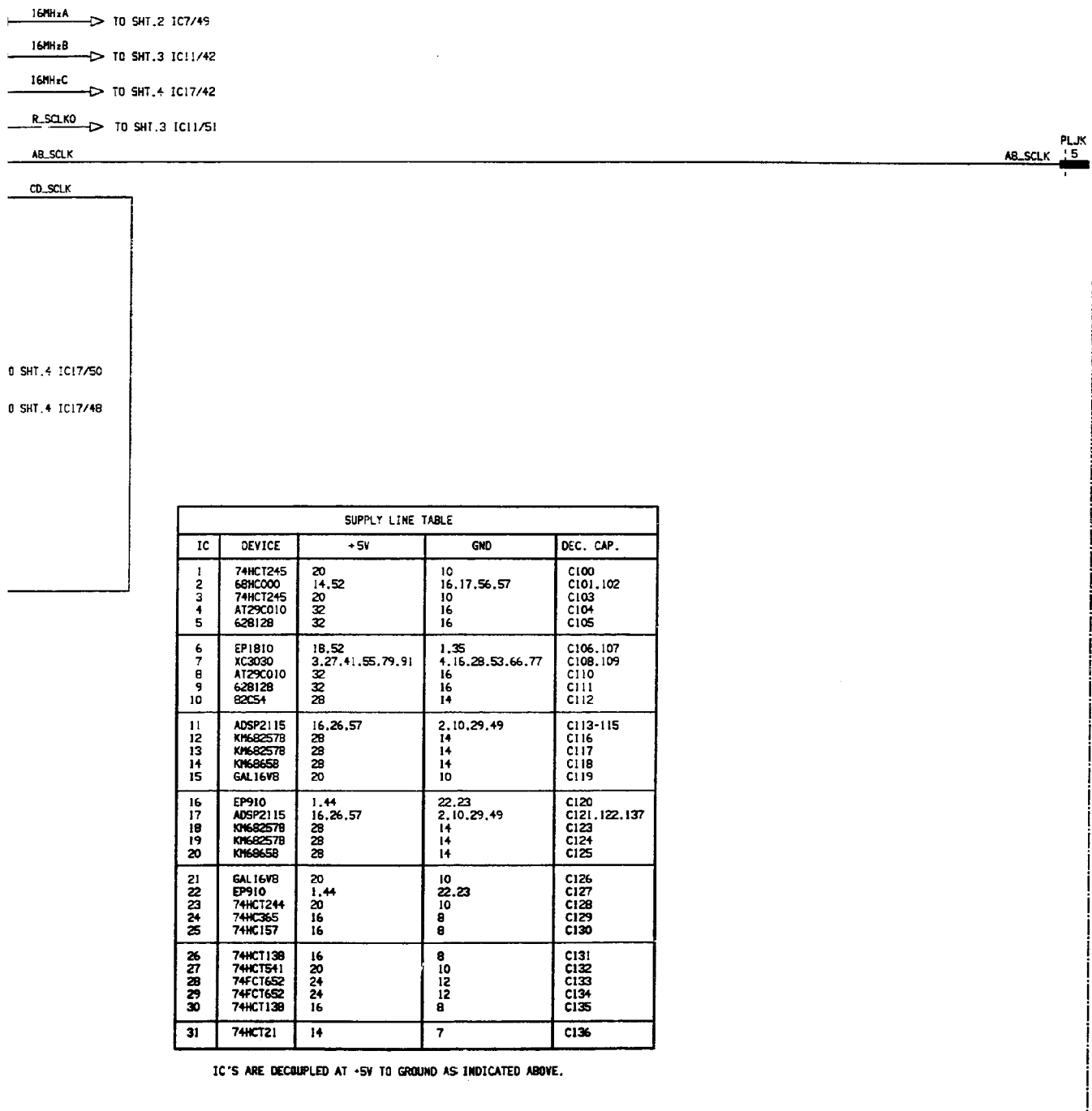
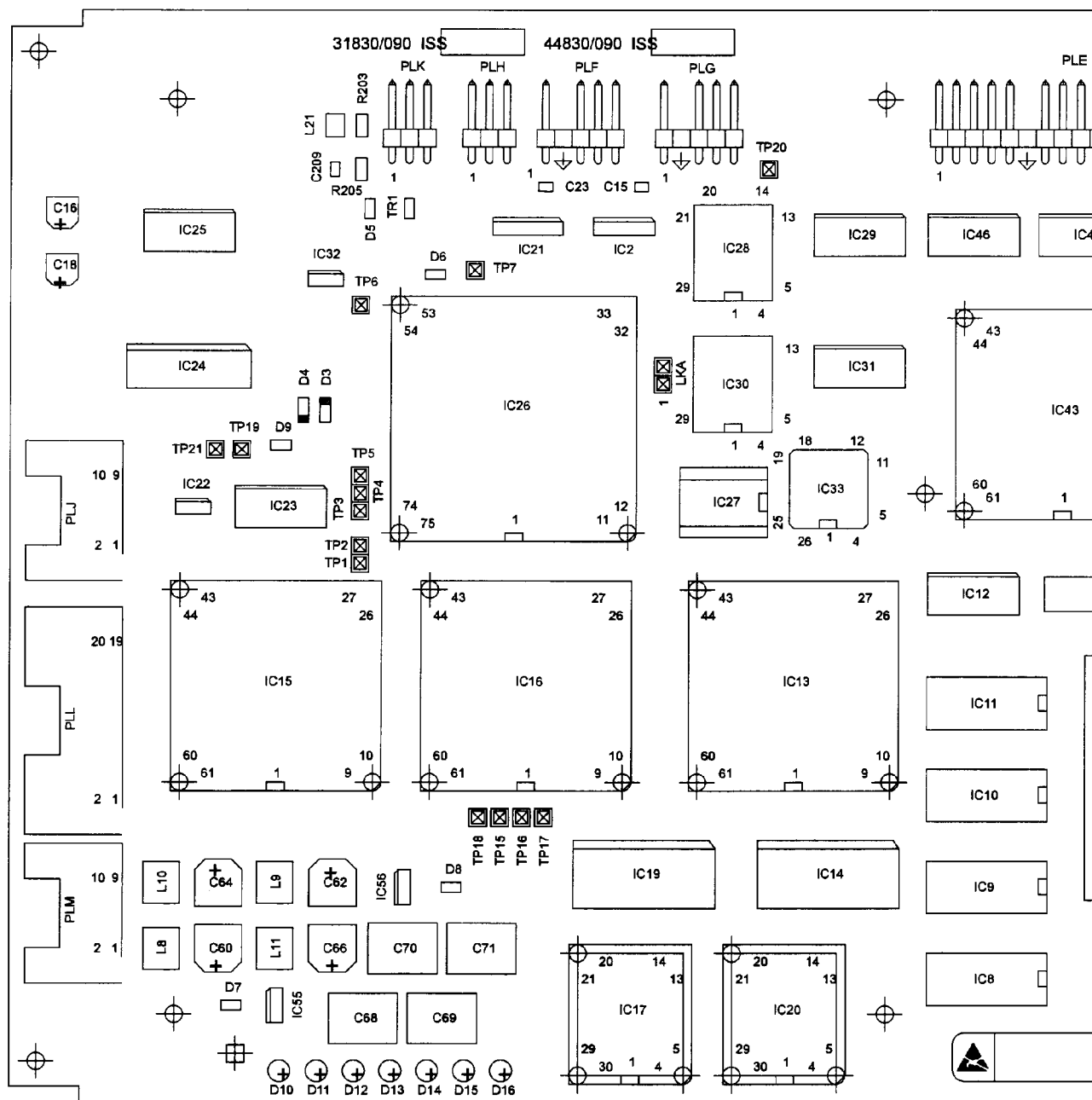
Circuit diagrams **A4**

Fig. 7-74 A4 DSP clock and A4 power supply distribution - circuit

# SERVICING DIAGRAMS

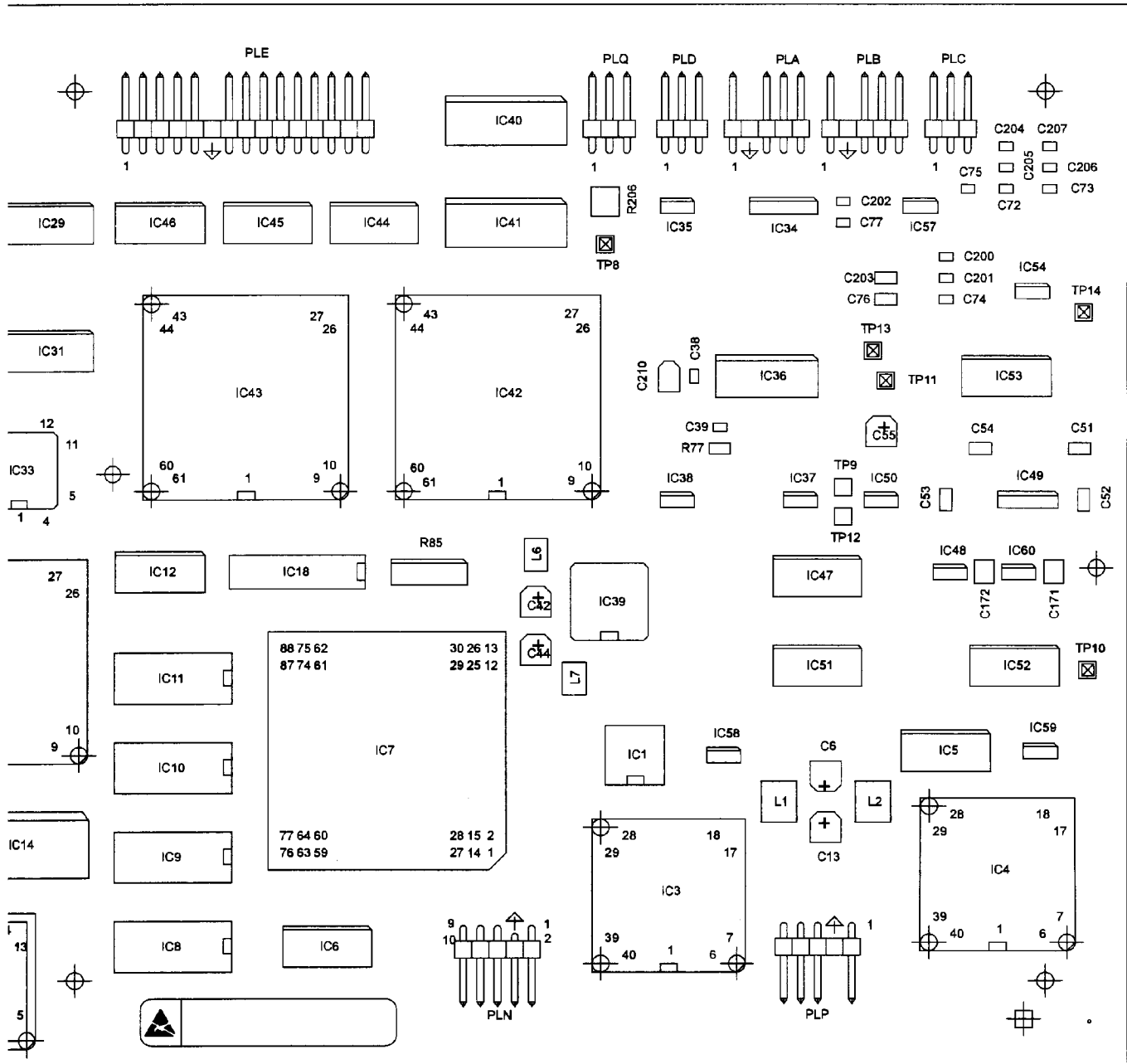


**DSP clock and A4 power supply distribution A4**

Drg. No. 44829/83



# Component layout **A5**



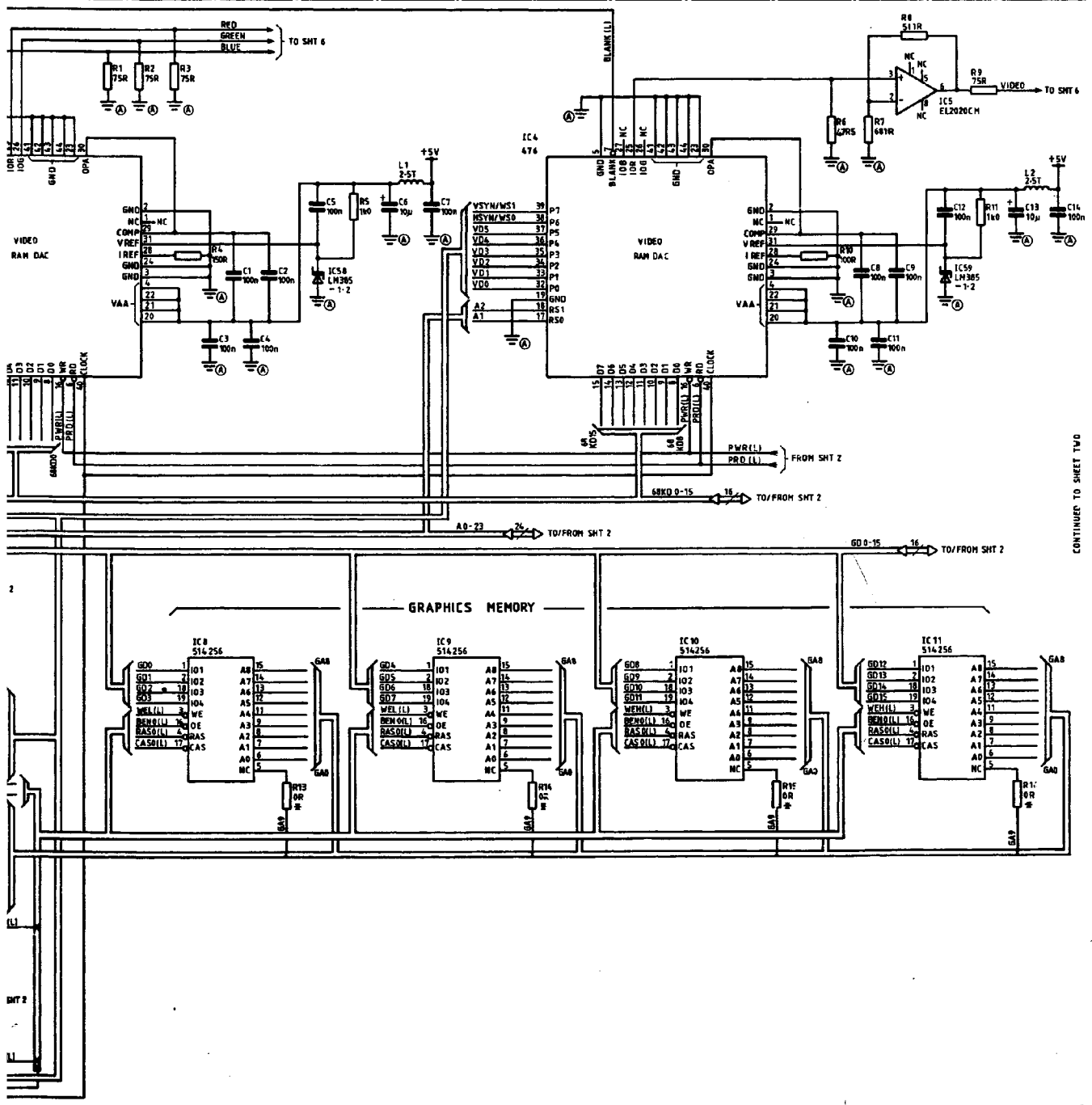
**A4**

Drg. No. 44829/835 Sheet 1 of 2 Issue 4

Fig. 7-75 A5 Display - component layout, component side

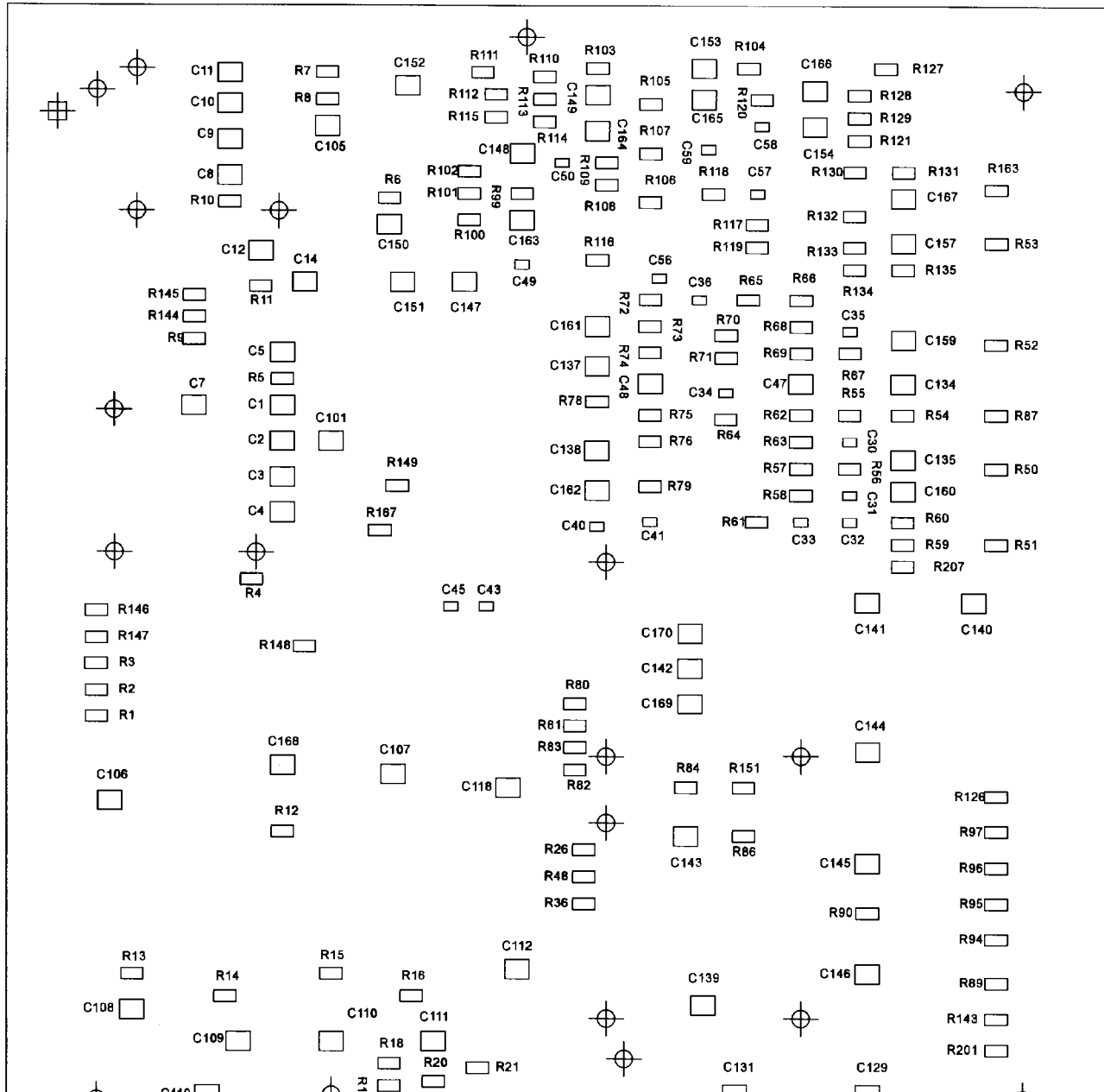
46882-168



Circuit diagrams **A5**

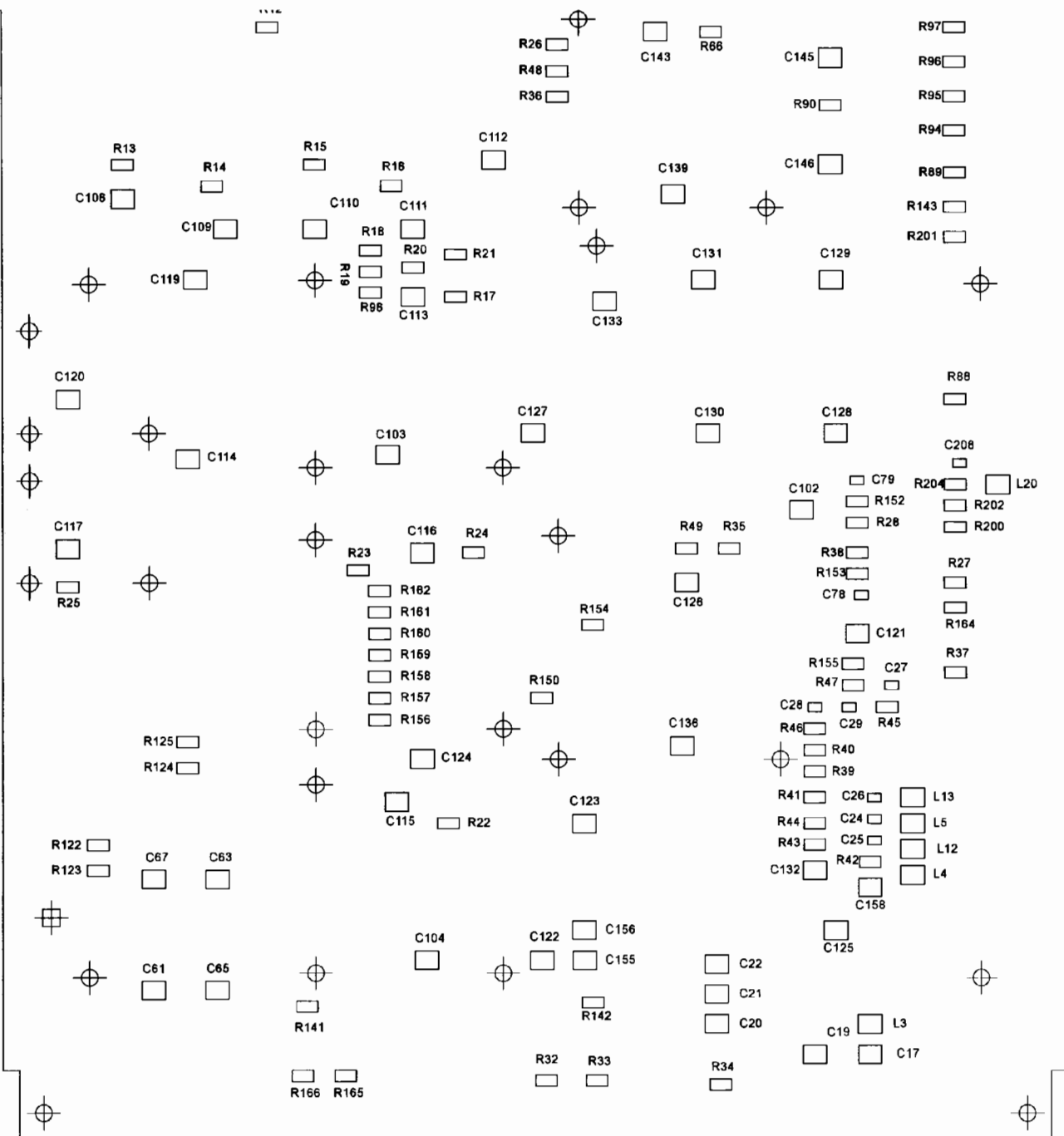
CONTINUED TO SHEET TWO

Fig. 7-76 A5 Graphics - circuit

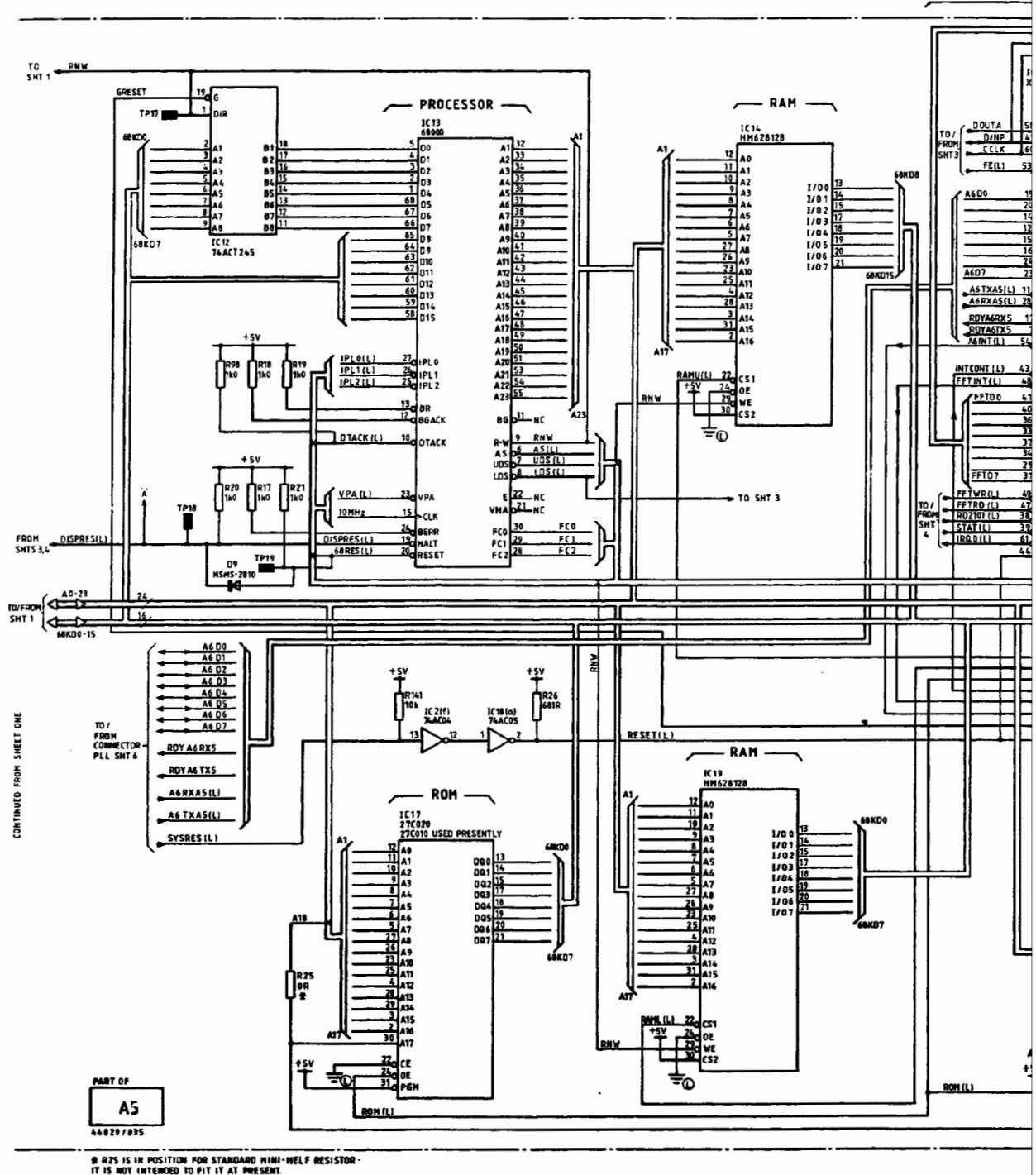


Graphics A5

Dwg. No. 44829/83



## Component layout A5



PART OF  
A5  
44829/835

\* R25 IS IN POSITION FOR STANDARD MINI-WELF RESISTOR - IT IS NOT INTENDED TO FIT IT AT PRESENT.

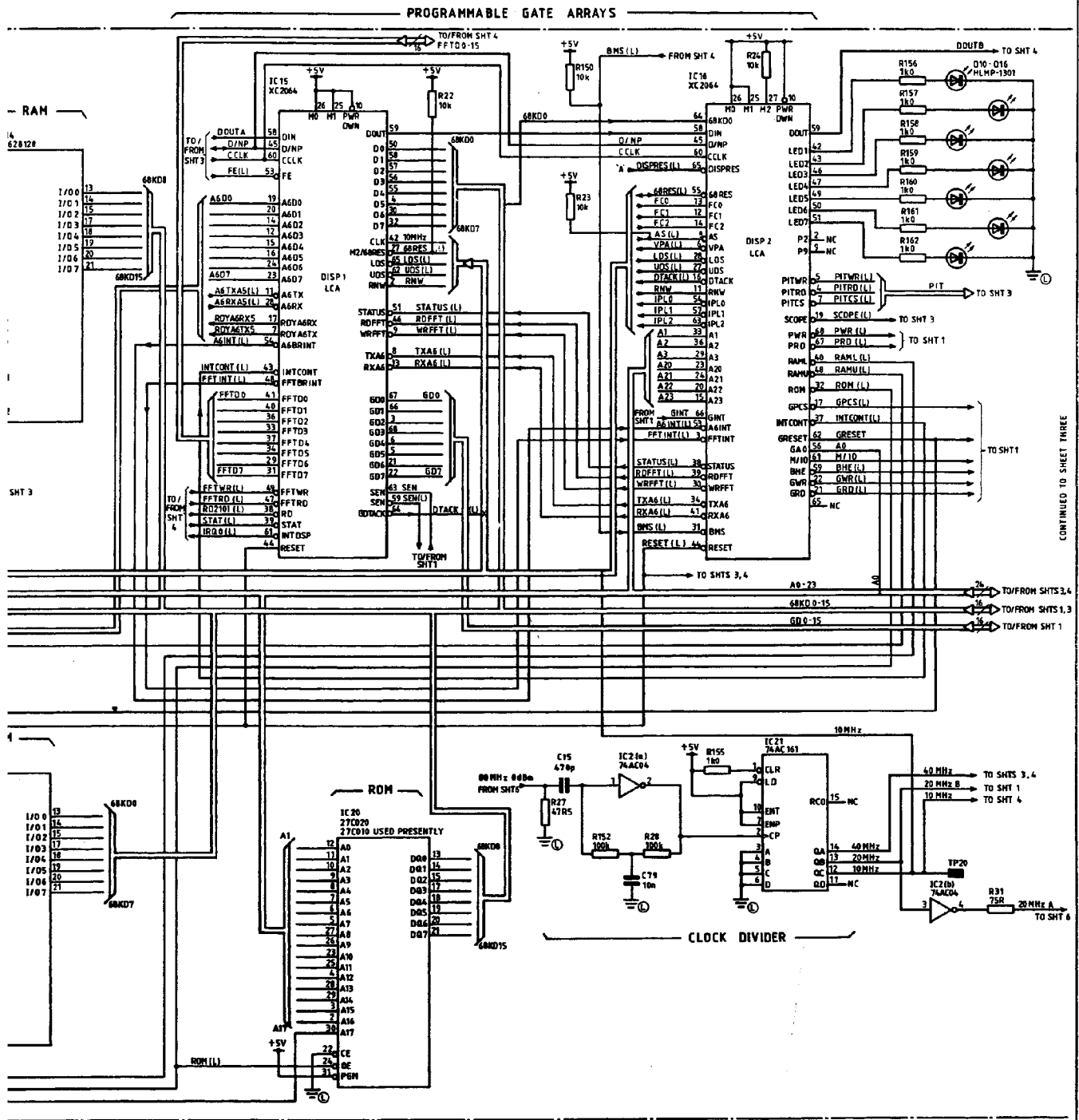
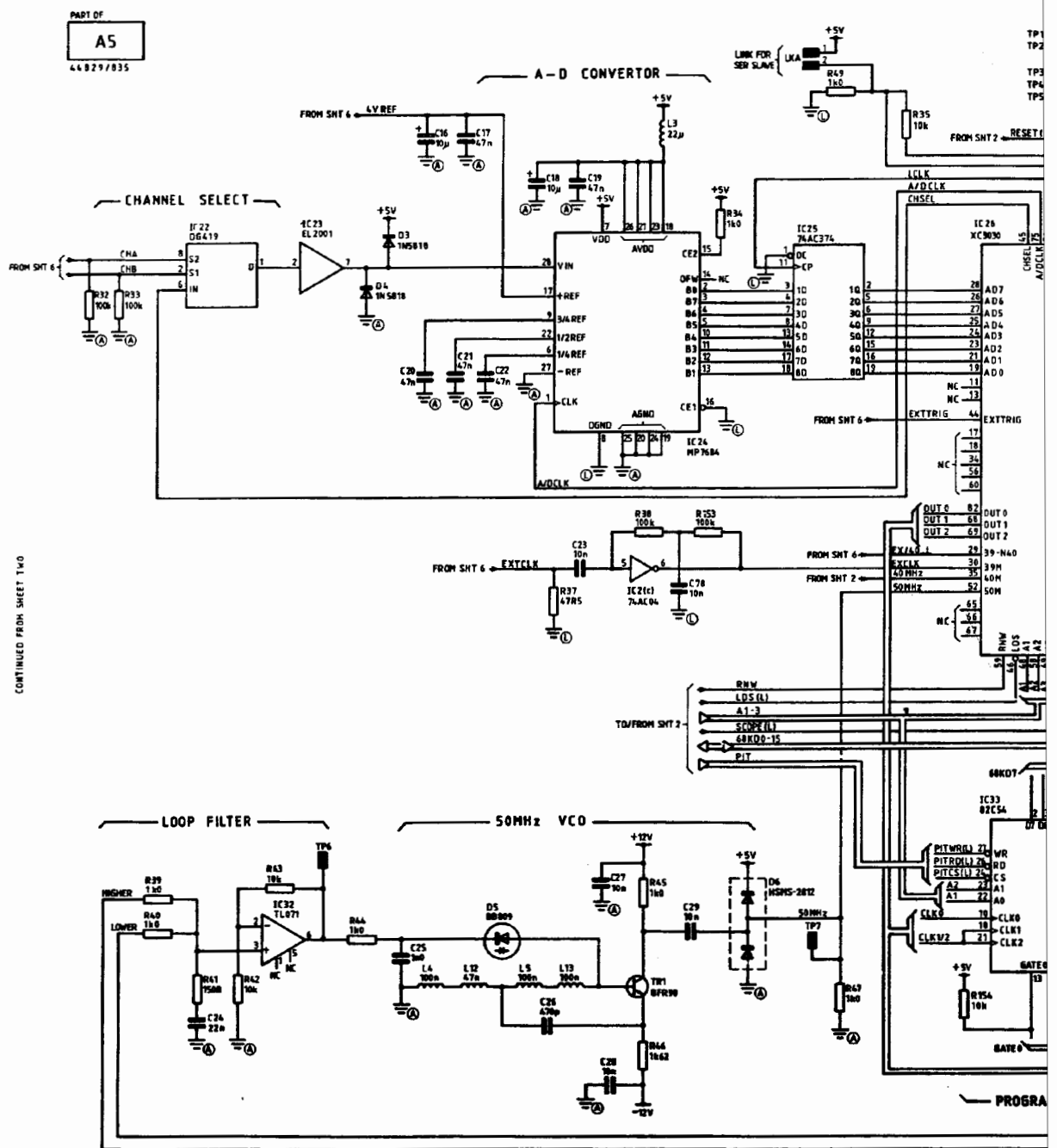
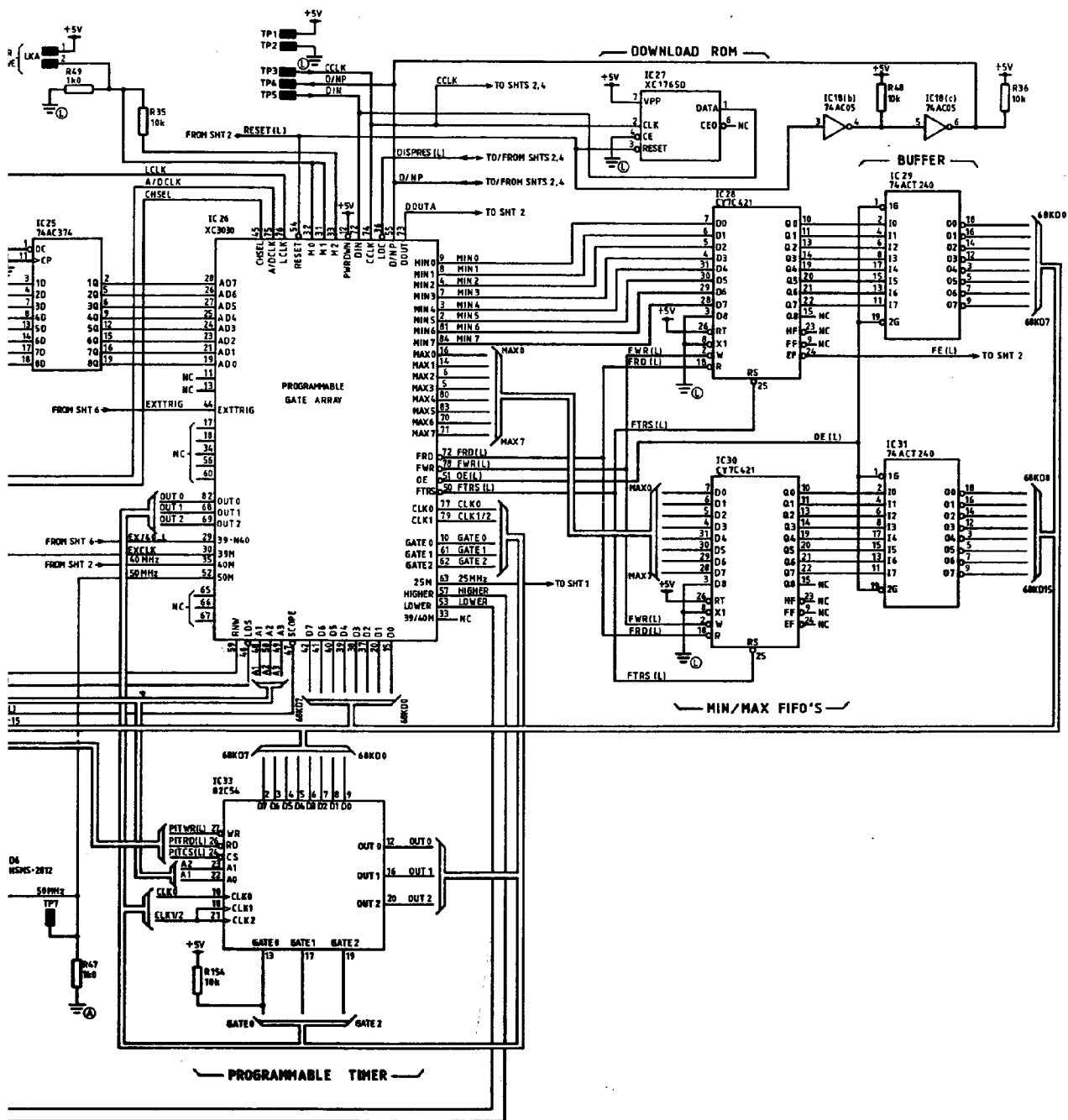
Circuit diagrams **A5**

Fig. 7-78 A5 Main processor - circuit



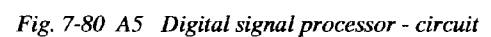


Circuit diagrams **A5**

CONTINUED TO SHEET FOUR

Fig. 7-79 A5 Scope - circuit

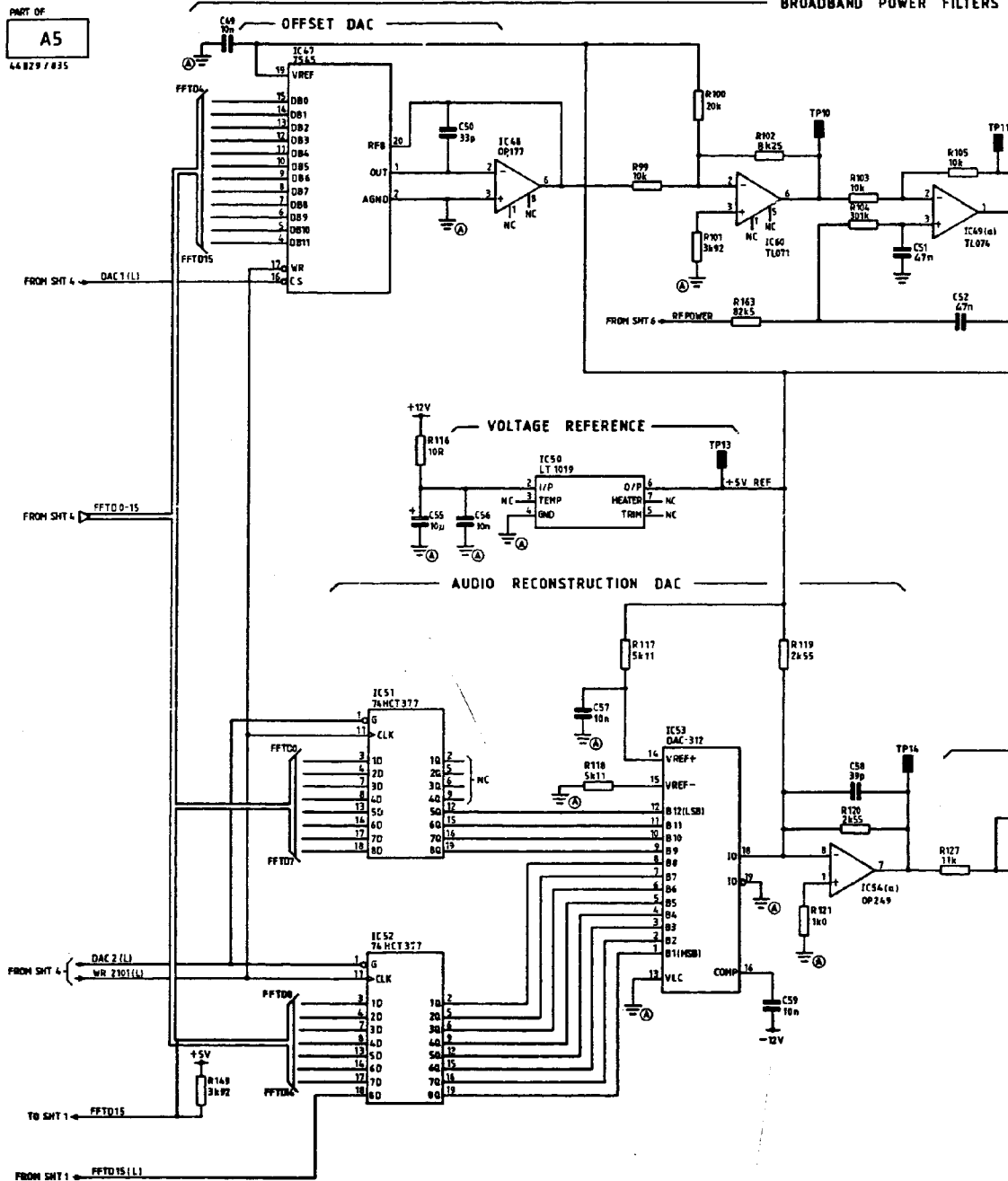




PART OF  
A5  
44 829 / 835

# BROADBAND POWER FILTERS

CONTINUED FROM SHEET FOUR



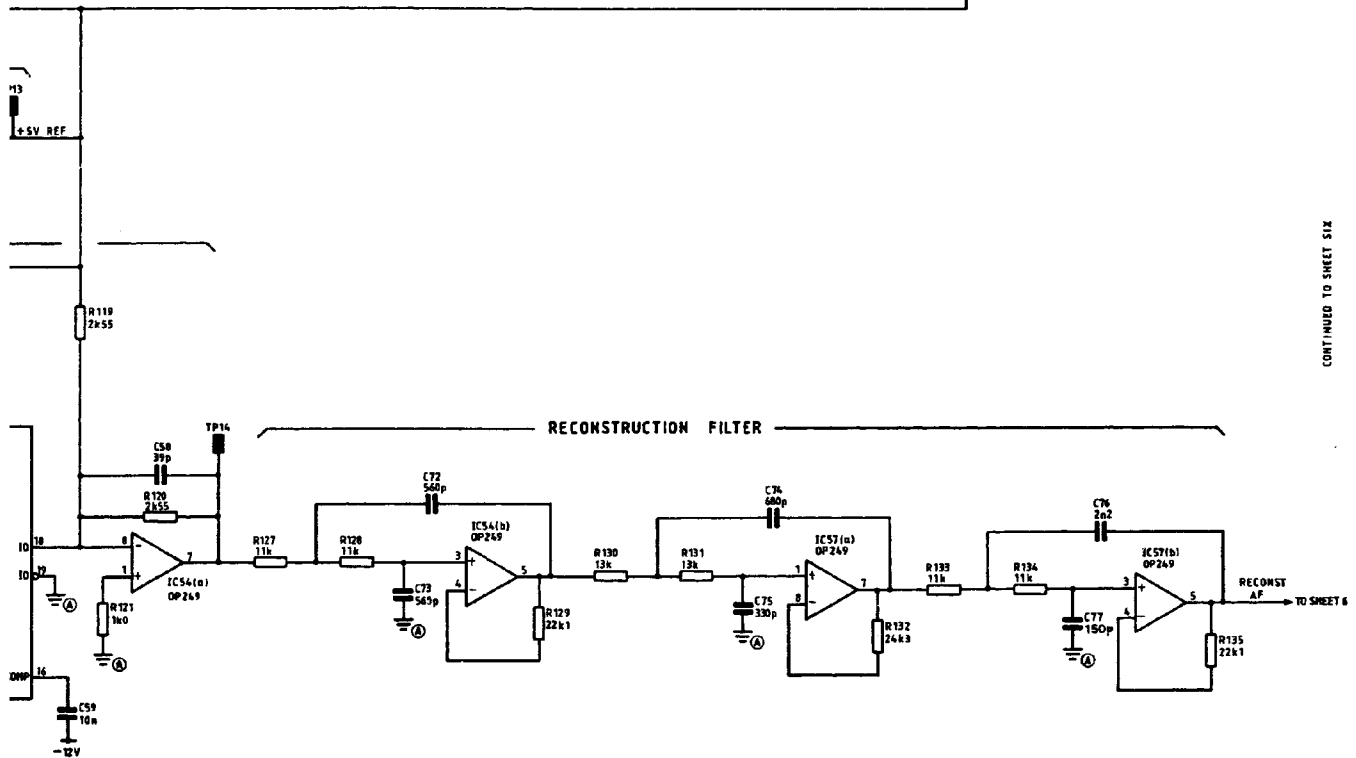
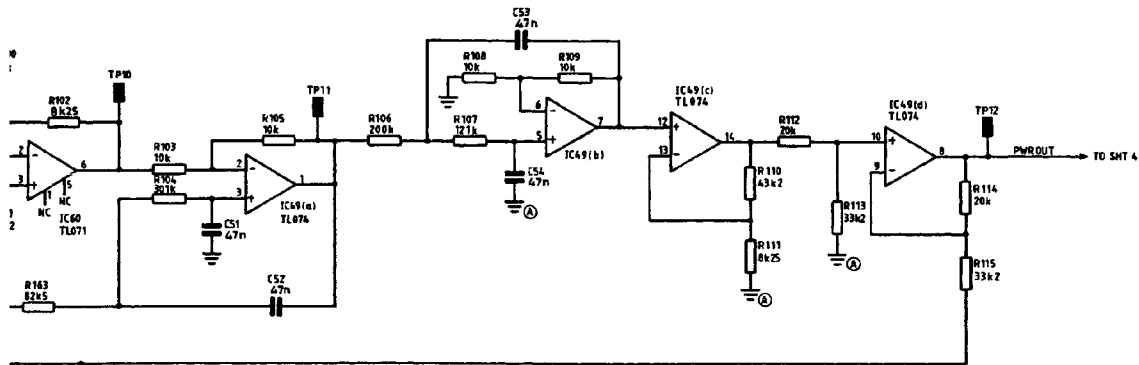
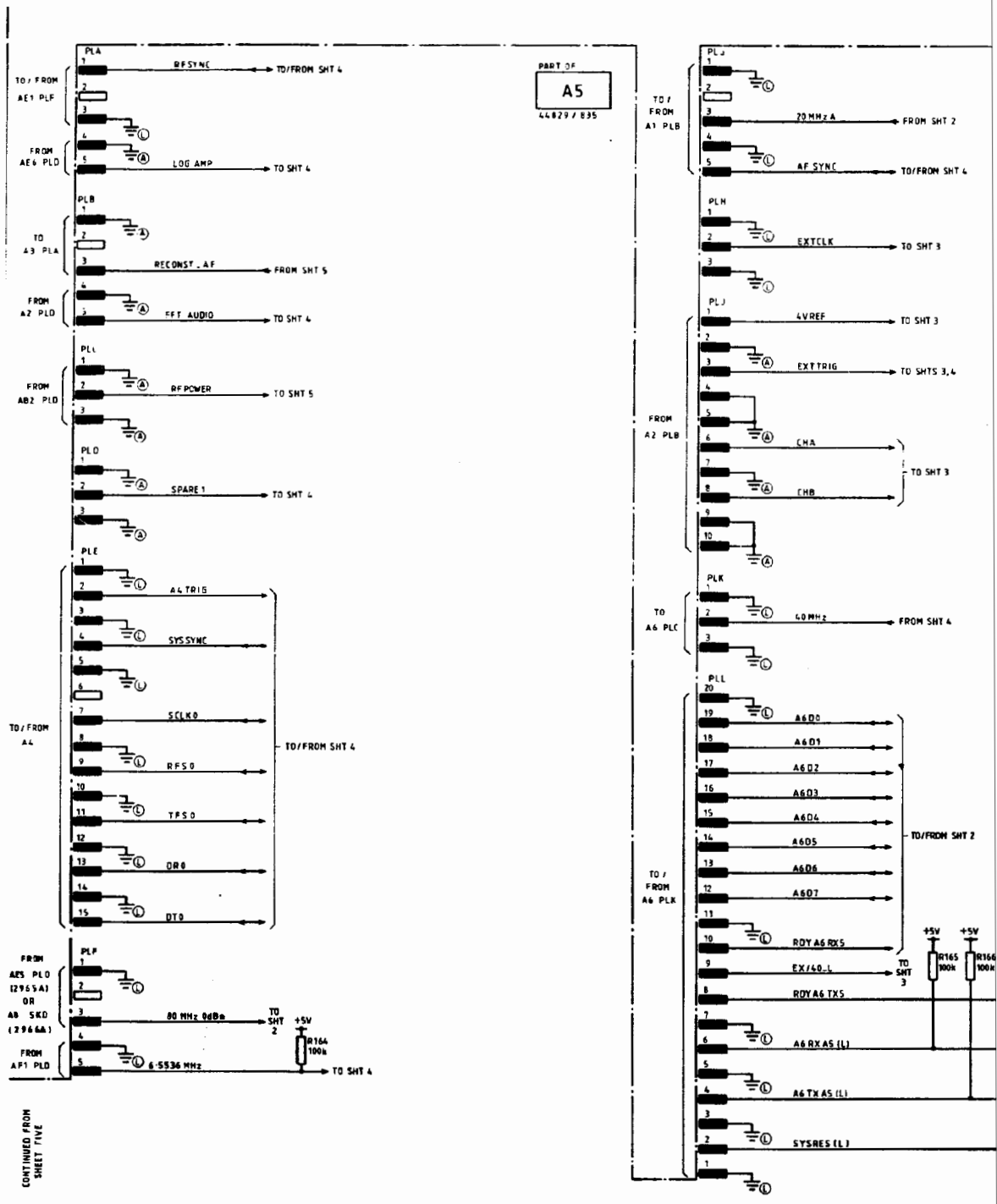
Circuit diagrams **A5****BROADBAND POWER FILTERS**

Fig. 7-81 A5 Digital to analogue converters - circuit



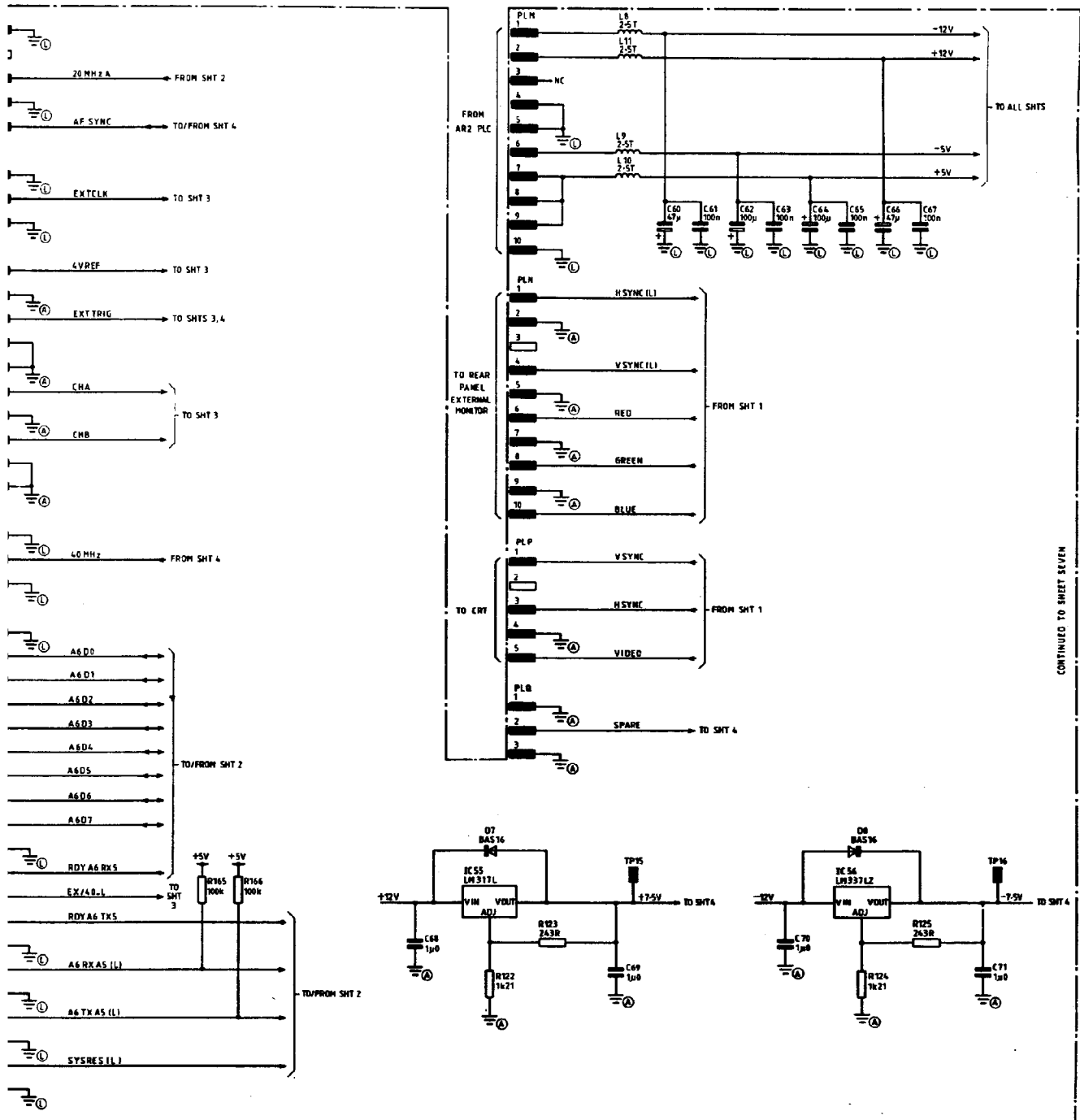
Circuit diagrams **A5**

Fig. 7-82 A5 Connectors and power inputs - circuit

DIGITAL SUPPLY PIN C

SUPPLY LINE		
IC No	+5V PIN(S)	0
1	20	
2	14	
6	20	
8	10	
9	10	
10	10	
11	10	
12	20	
13	14,52	
14	32	
15	10,52	
16	10,52	
17	32	
18	14	
19	32	
20	32	
21	16	
25	20	
26	22,66	
27	8	
28	32	
29	20	
30	32	
31	20	
33	20	
40	20	
41	20	
43	10,52	
44	20	
45	20	
46	20	
51	20	
52	20	
7	-	
42	-	



Circuit diagrams **A5**

PART OF

**A5**

44029/835

DIGITAL SUPPLY PIN CONNECTIONS &amp; DECOUPLING

SUPPLY LINE TABLE			
IC No.	+5V PIN(S)	GND PIN(S)	DEC CAP(S)
1	20	10	C101
2	14	7	C102
6	20	10	C106
8	10	20	C108
9	10	20	C109
10	10	20	C110
11	10	20	C111
12	20	10	C112
13	14, 52	16, 17, 54, 57	C113, 103
14	32	16	C114
15	10, 52	1, 35	C115, 104
16	10, 52	1, 35	C116, 124
17	32	16	C117
18	14	7	C118
19	32	16	C119
20	32	16	C120
21	16	8	C121
25	20	10	C125
26	22, 64	43, 1	C126, 136
27	8	5	C127
28	32	16	C128
29	20	10	C129
30	32	16	C130
31	20	10	C131
33	28	14	C133
40	28	14	C140
41	28	14	C141
43	10, 52	1, 35	C143, 139
44	20	10	C144
45	20	10	C145
46	20	10	C146
51	20	10	C151
52	20	10	C152
7	-	-	C107, 160
42	-	-	C142, 149, 170

ANALOGUE SUPPLY PIN CONNECTIONS &amp; DECOUPLING

SUPPLY LINE TABLE						
IC No.	+12V PIN	-12V PIN	0Vn PIN	+ 5V PIN	DECOUPLING	
					+12V	-12V
5	7	4	-	-	C105	C150
22	4	7	3	5	C122	C155
23	1	4	-	-	C123	C156
32	7	4	-	-	C132	C158
34	13	4	5	12	C134	C159
35	6	2	-	-	C135	C160
37	4	7	3	5	C137	C161
38	7	4	-	-	C138	C162
47	18	-	3	-	C147	
48	7	4	-	-	C148	C163
49	4	11	-	-	C149	C164
53	20	17	-	-	C153	C165
54	6	2	-	-	C154	C166
57	6	2	-	-	C157	C167
60	7	4	-	-	C171	C172

ALL IC'S DECOUPLED AT SUPPLY TO GROUND AS INDICATED  
ALL CAPACITOR VALUES 100n

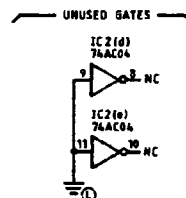
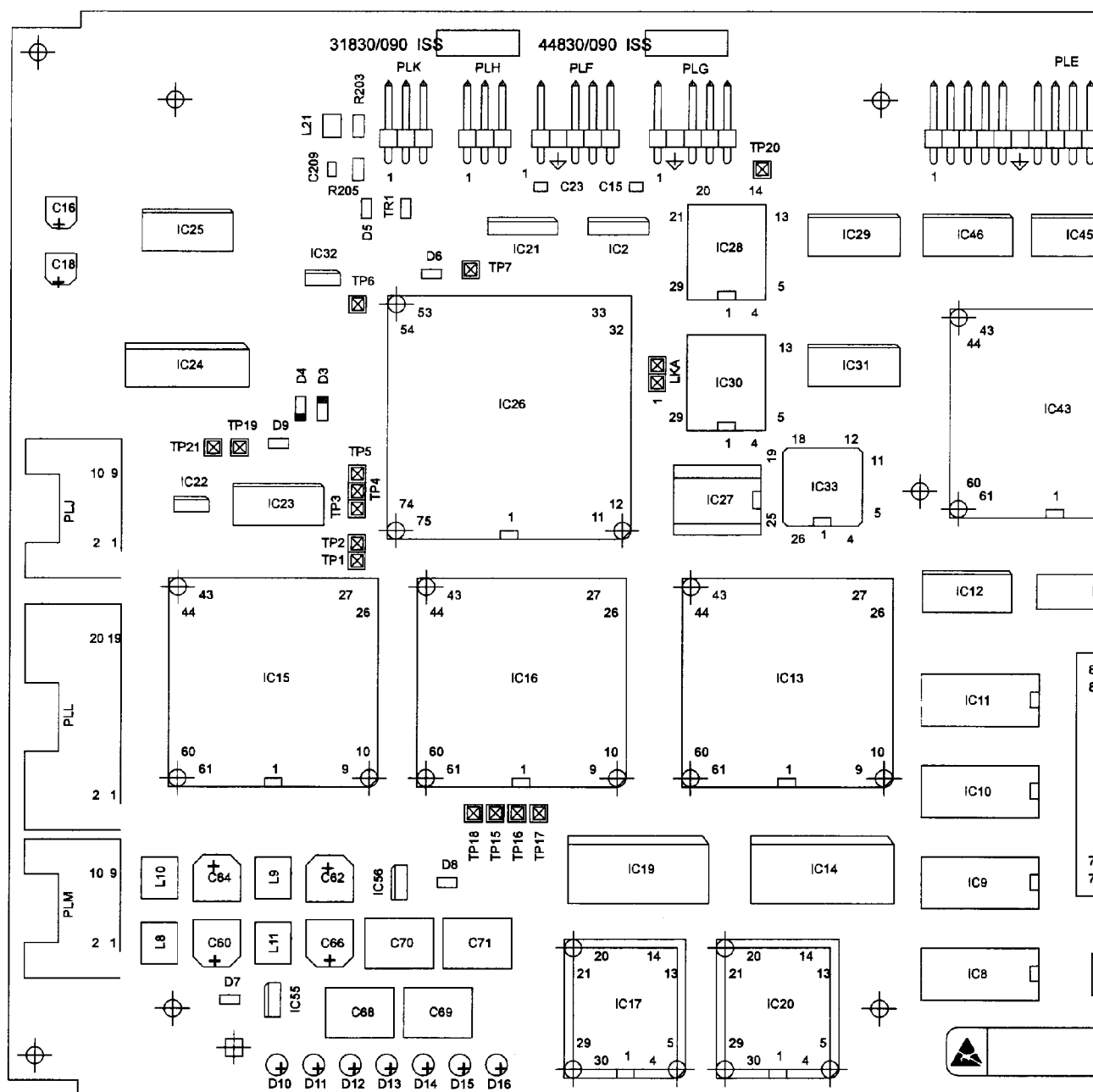


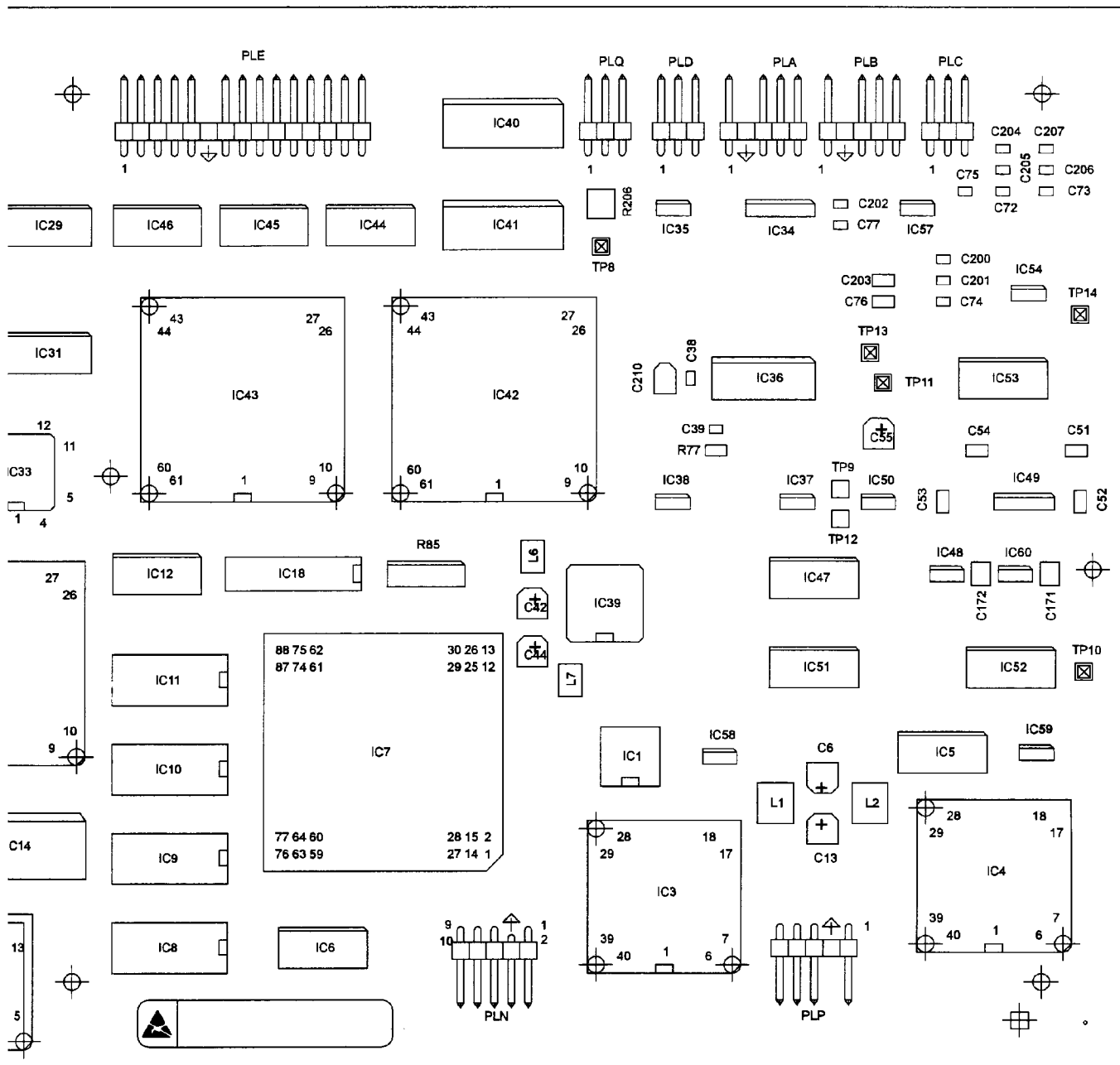
Fig. 7-83 A5 Power supply and decoupling arrangements



## Power supply and decoupling arrangements A5

Drg. No. 44830/090

# Component layout A5/2

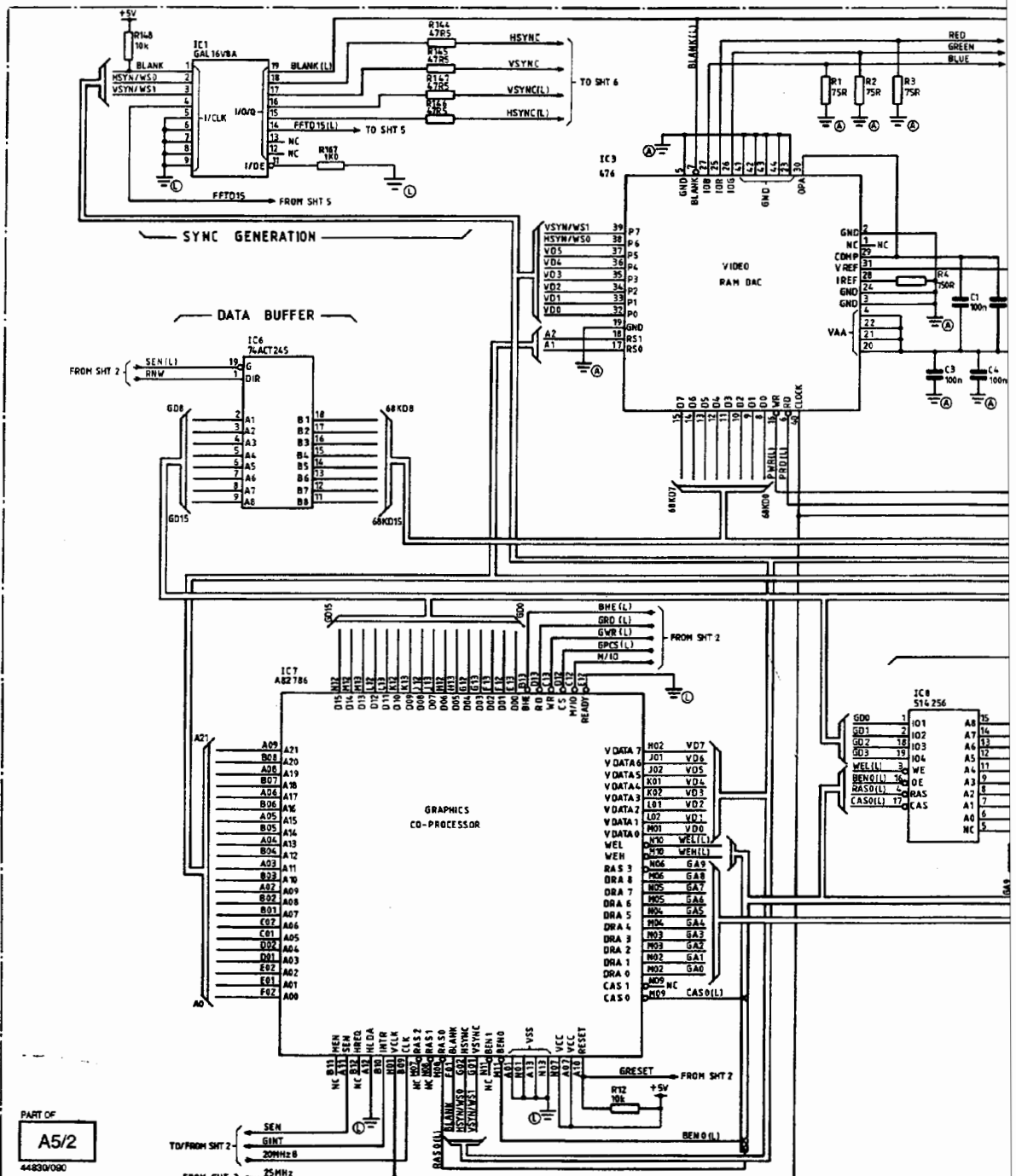


A5

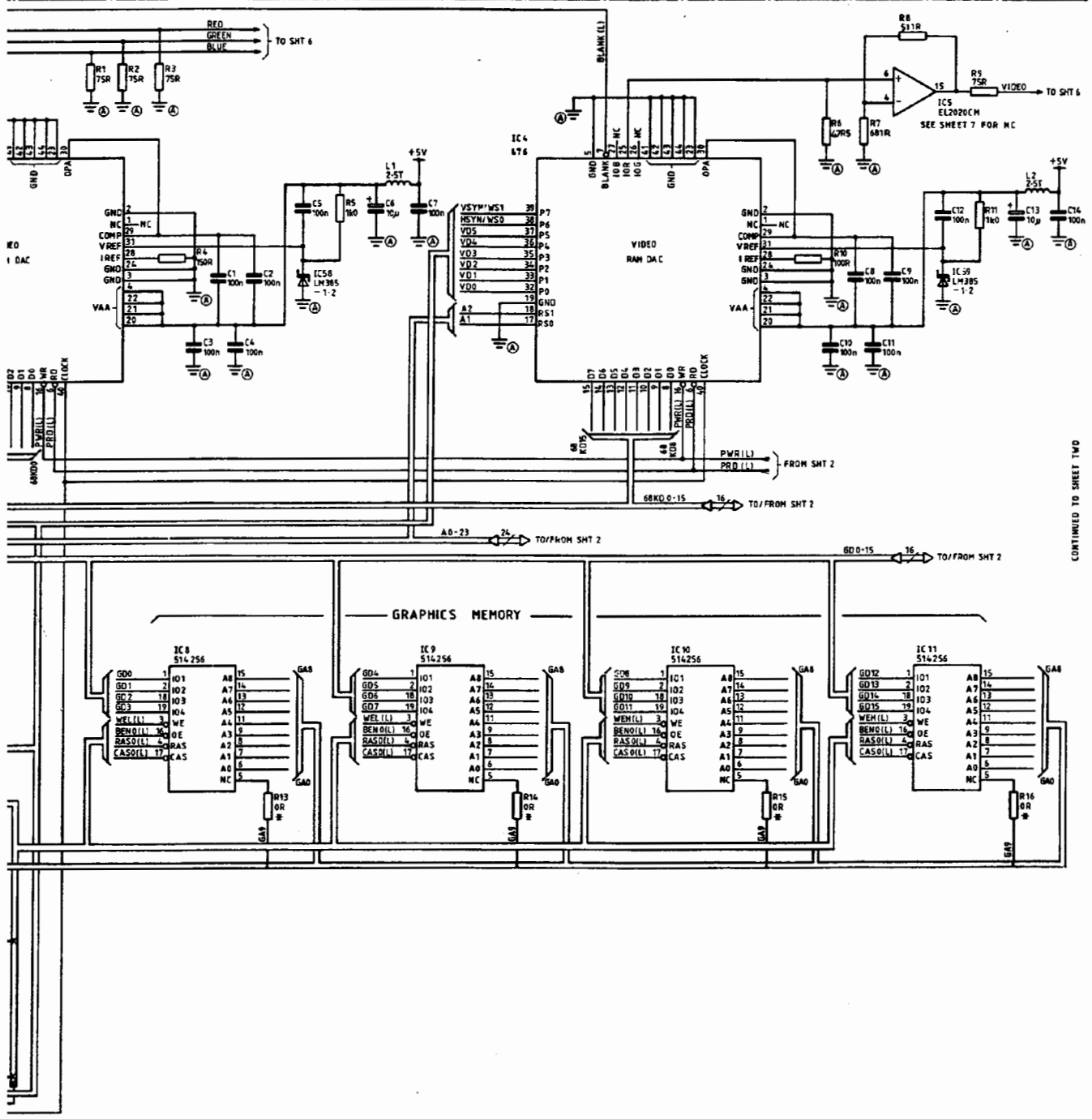
Drg. No. 44830/090 Sheet 1 of 2 Issue 3

Fig. 7-84 A5/2 Display - component layout, component side

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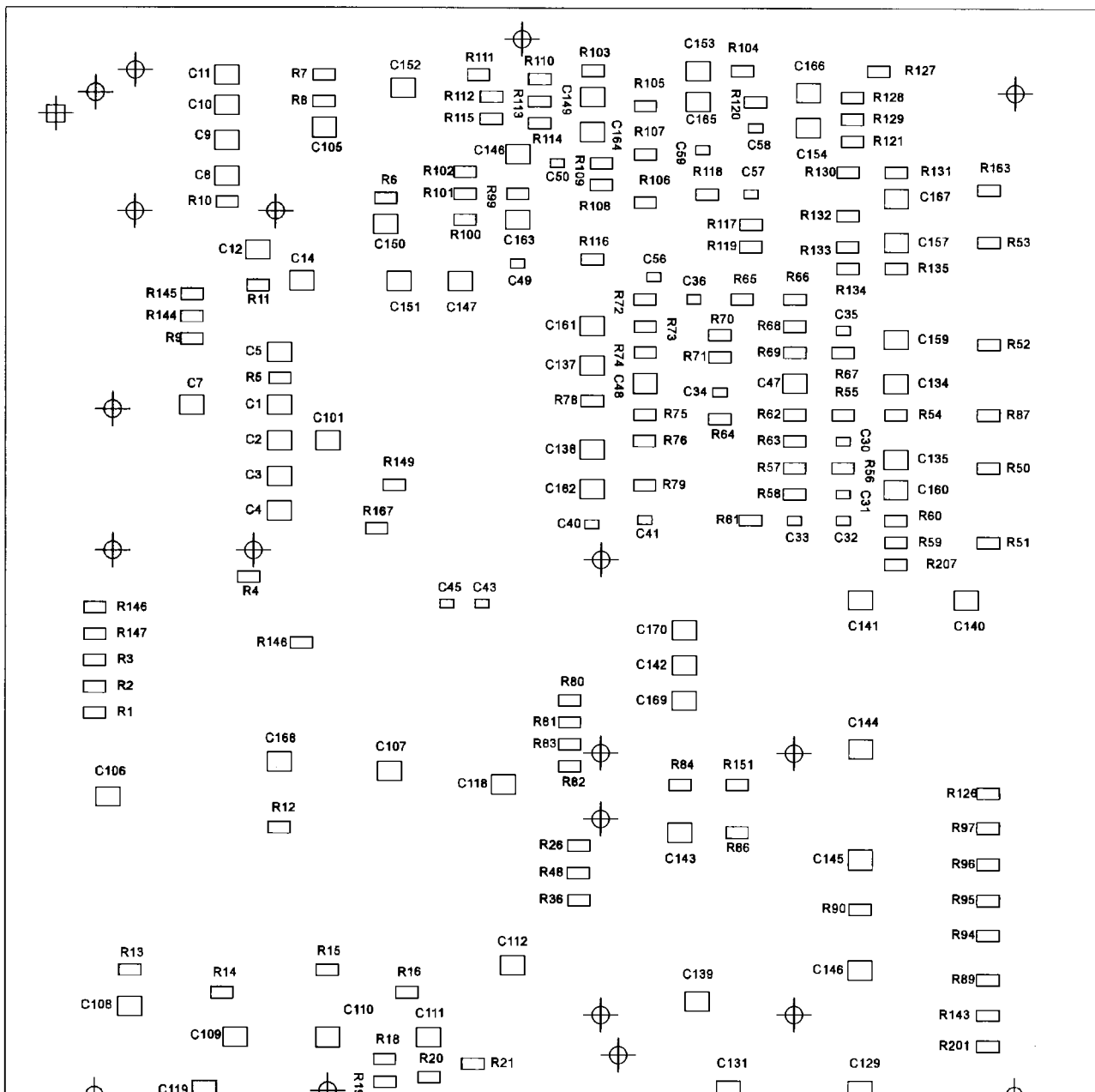


R R13-R16 ARE POSITIONS FOR STANDARD MINI-HELF RESISTORS - IT IS NOT INTENDED TO FIT THESE AT PRESENT.

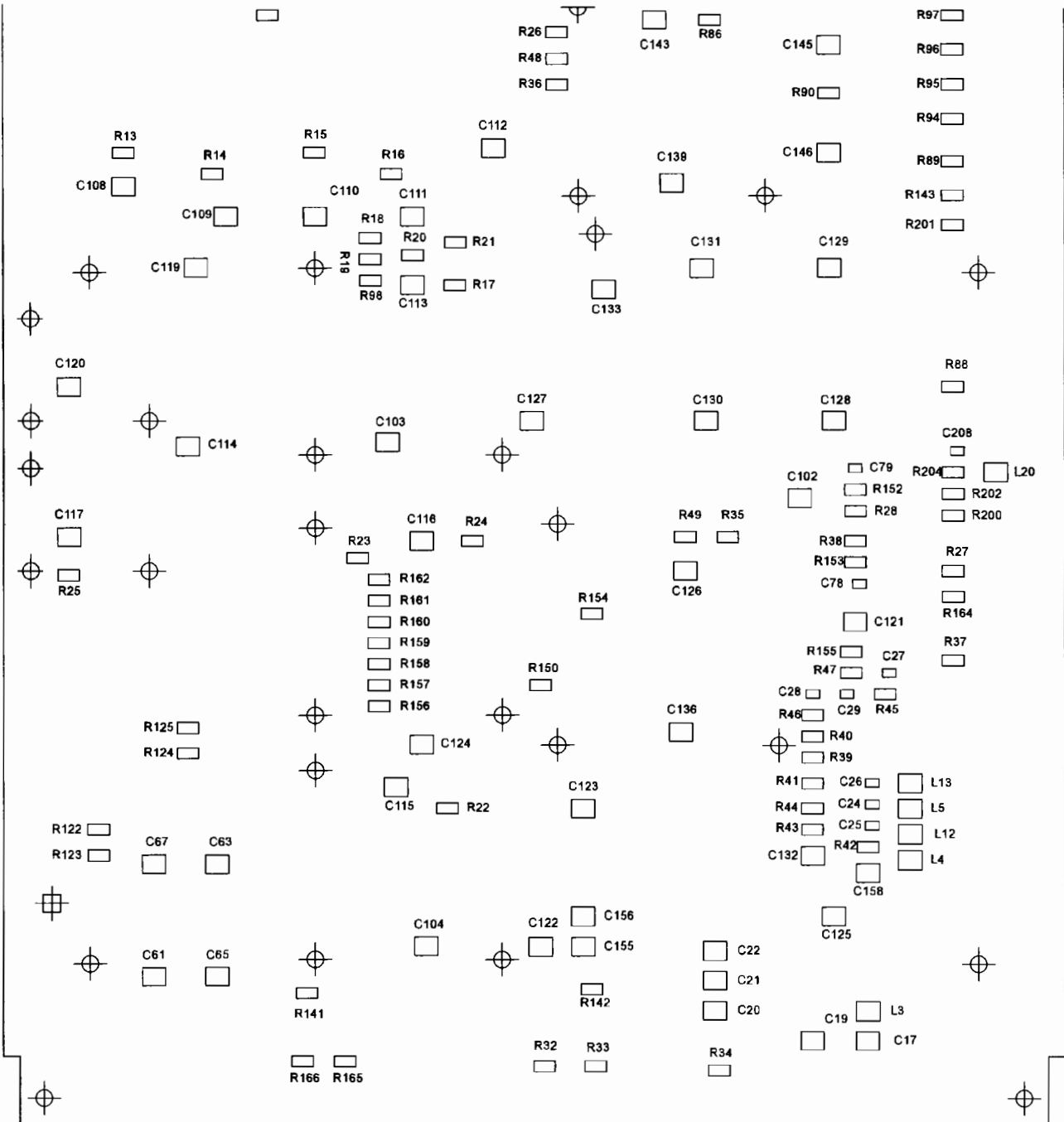
Circuit diagrams **A5/2**

CONTINUED TO SHEET TWO

Fig. 7-85 A5/2 Graphics - circuit



# Component layout A5/2



2

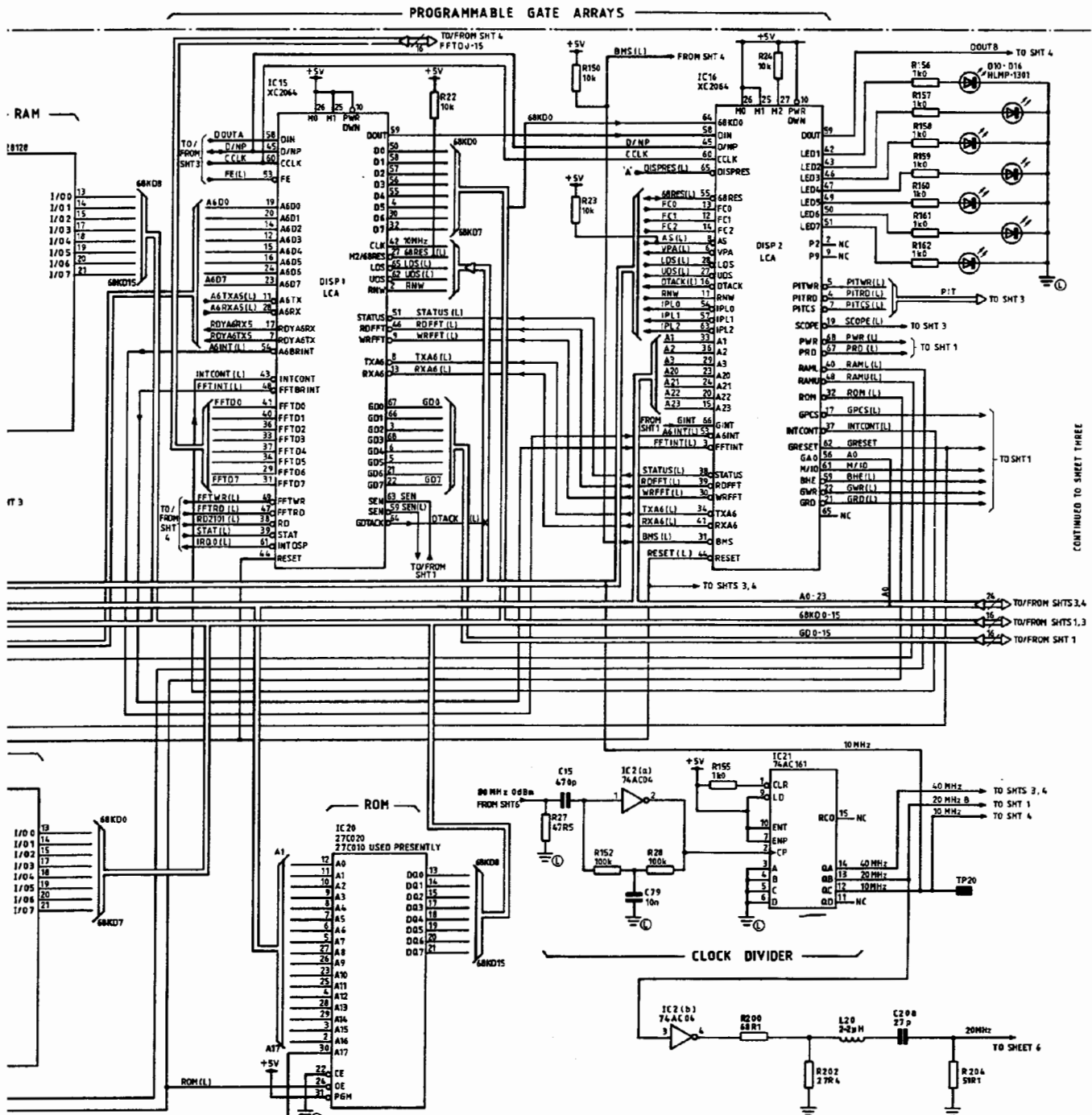
Drig. No. 44830/090 Sheet 2 of 2 Issue 3

Fig. 7-86 A5/2 Display - component layout, solder side

46882-168



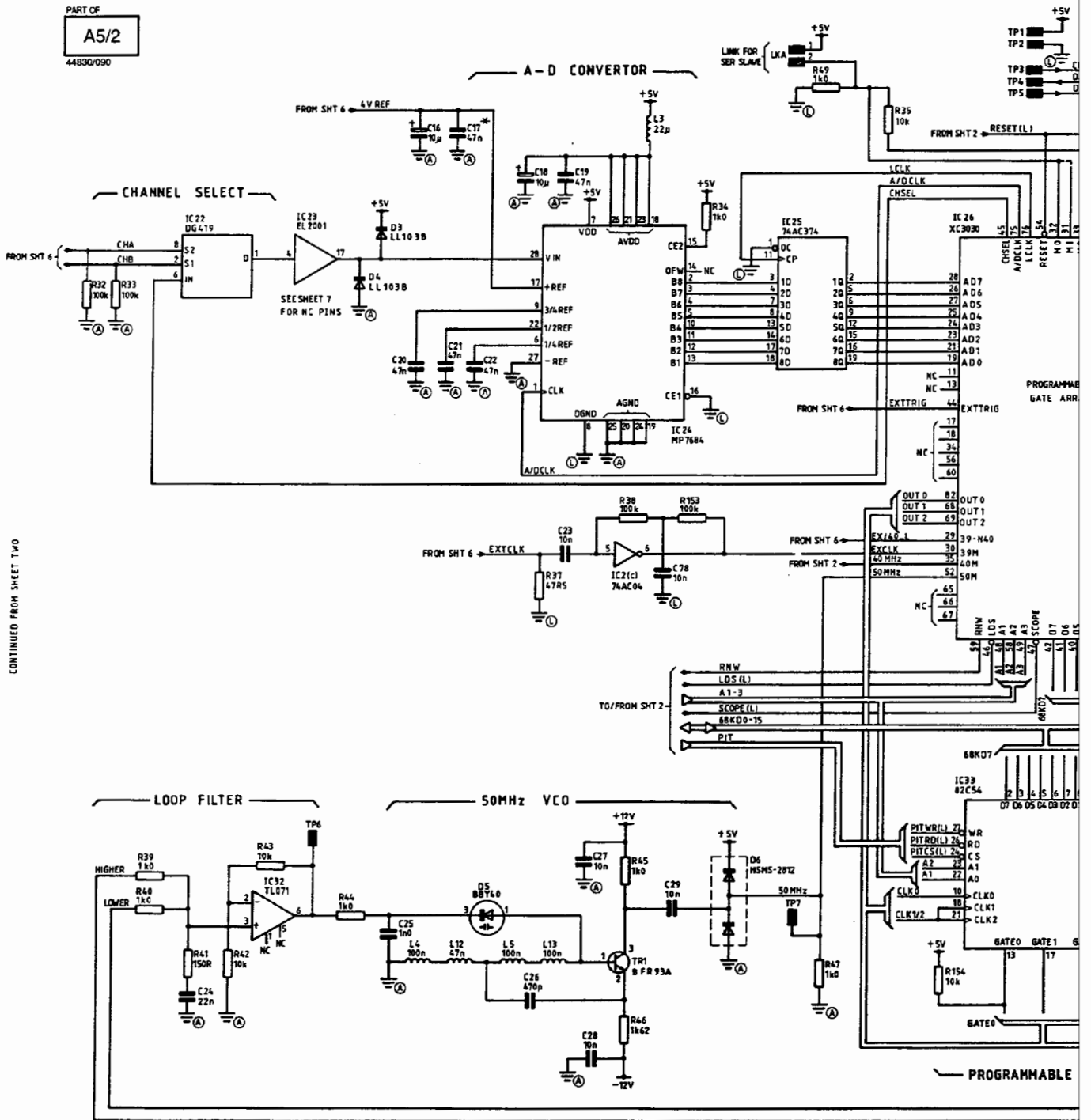


Circuit diagrams **A5/2**

R109, 202, 204, C208 & L20 COMPONENTS TO BE BUILT NEAR PLS NOTICE.  
ALL GROUNDS TO BE SHORT/THICK.

Fig. 7-87 A5/2 Main processor - circuit

PART OF  
A5/2  
44830/090



\* NOT FITTED

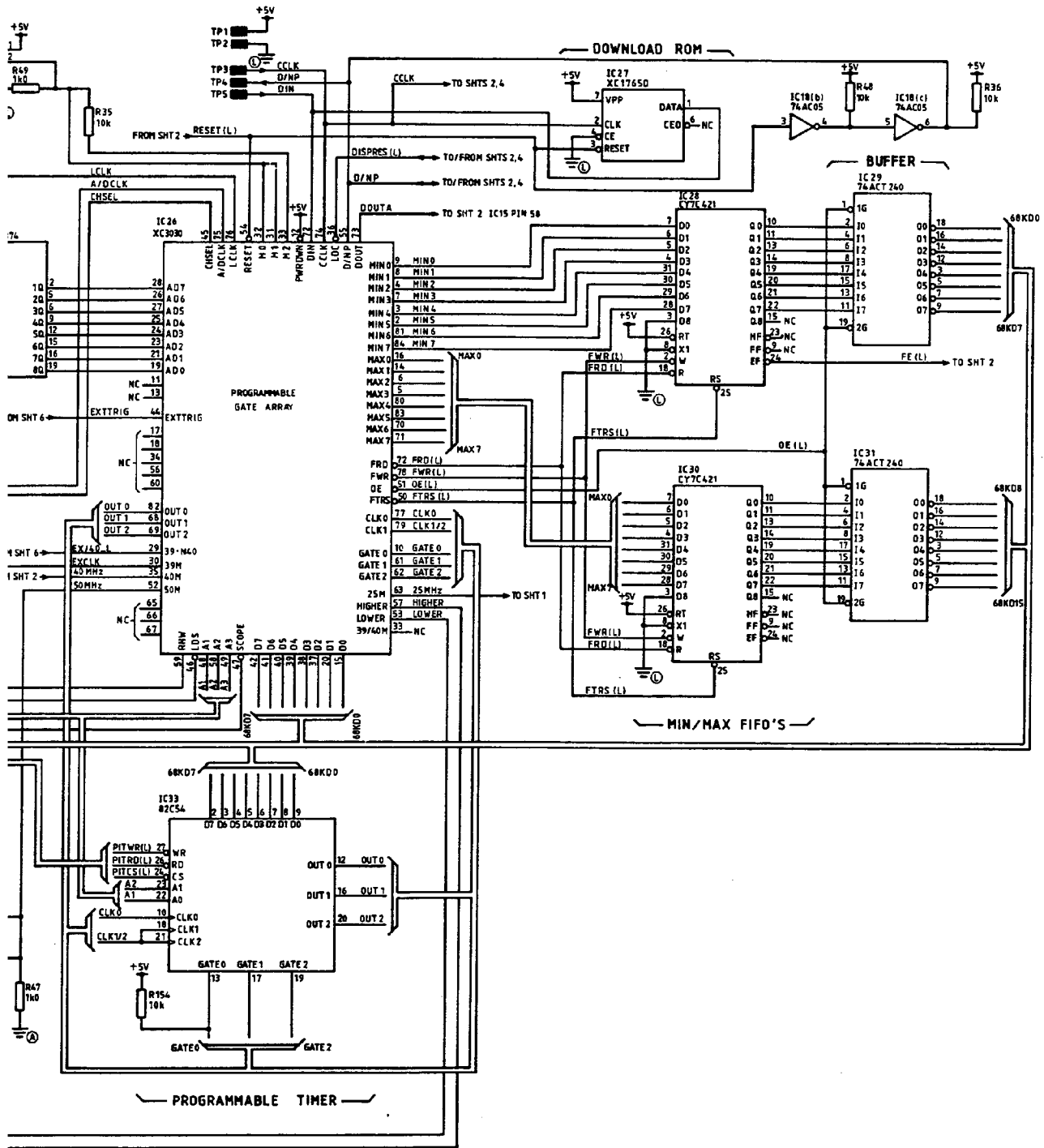
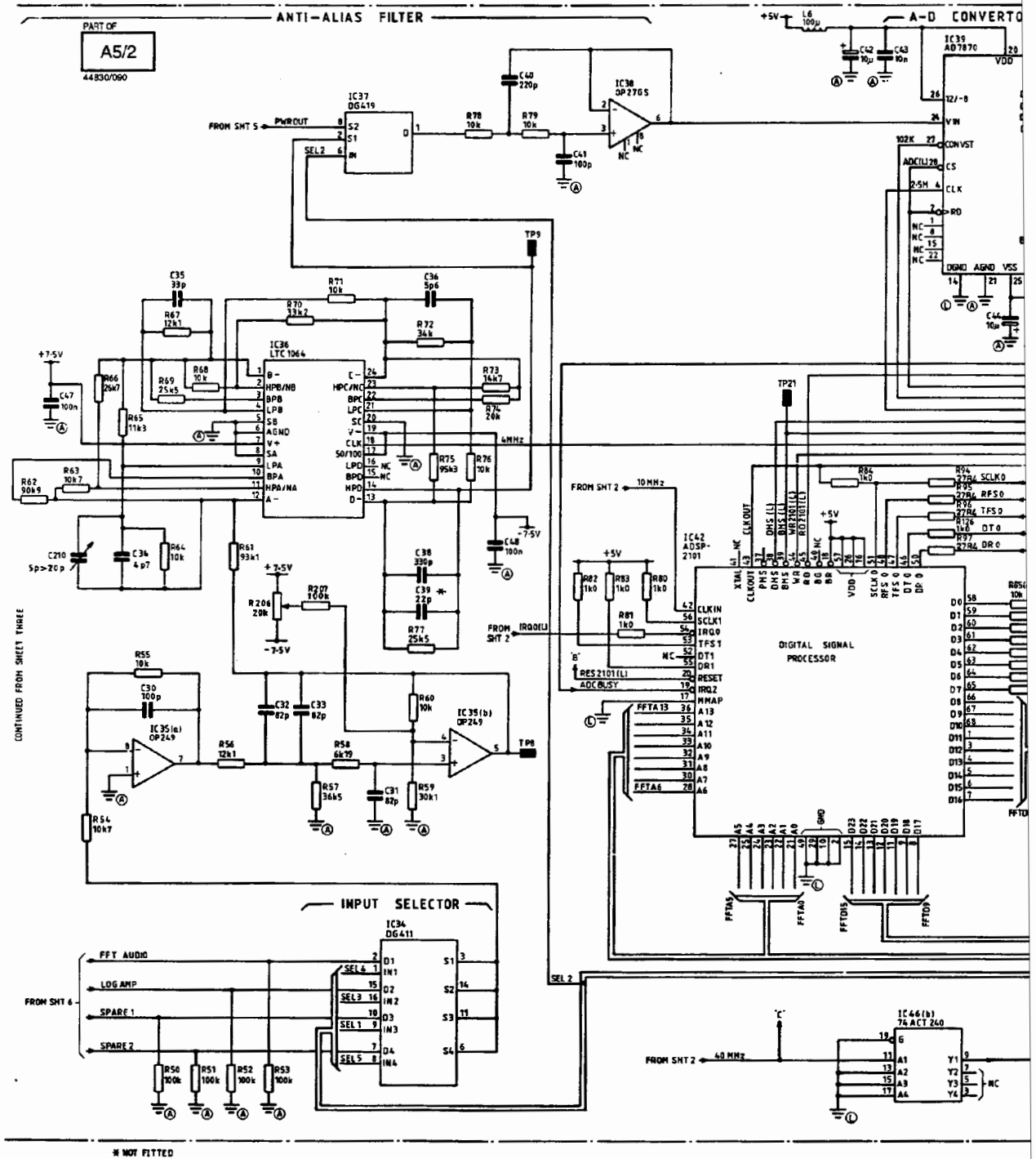
Circuit diagrams **A5/2**

Fig. 7-88 A5/2 Scope - circuit



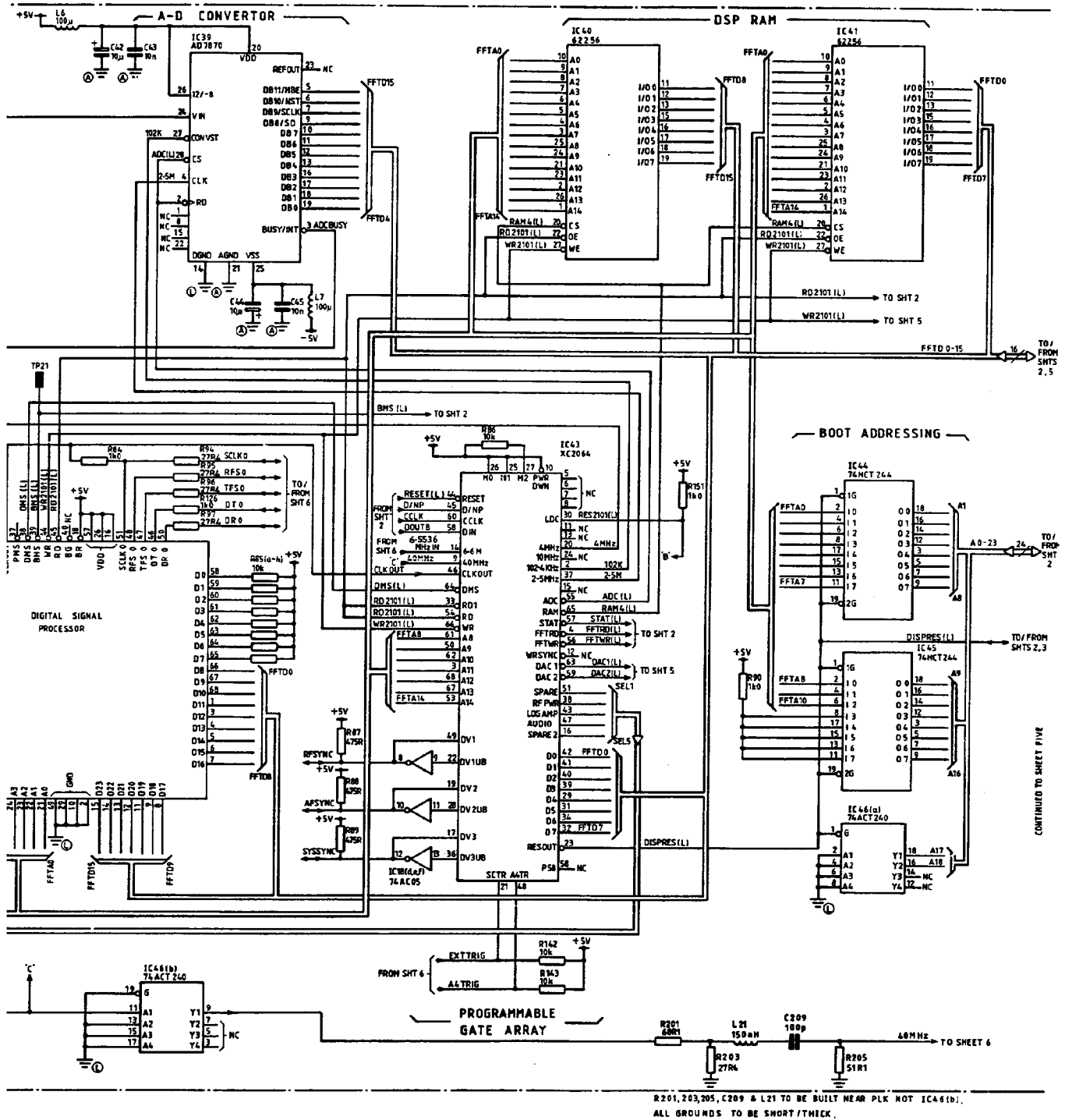
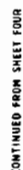
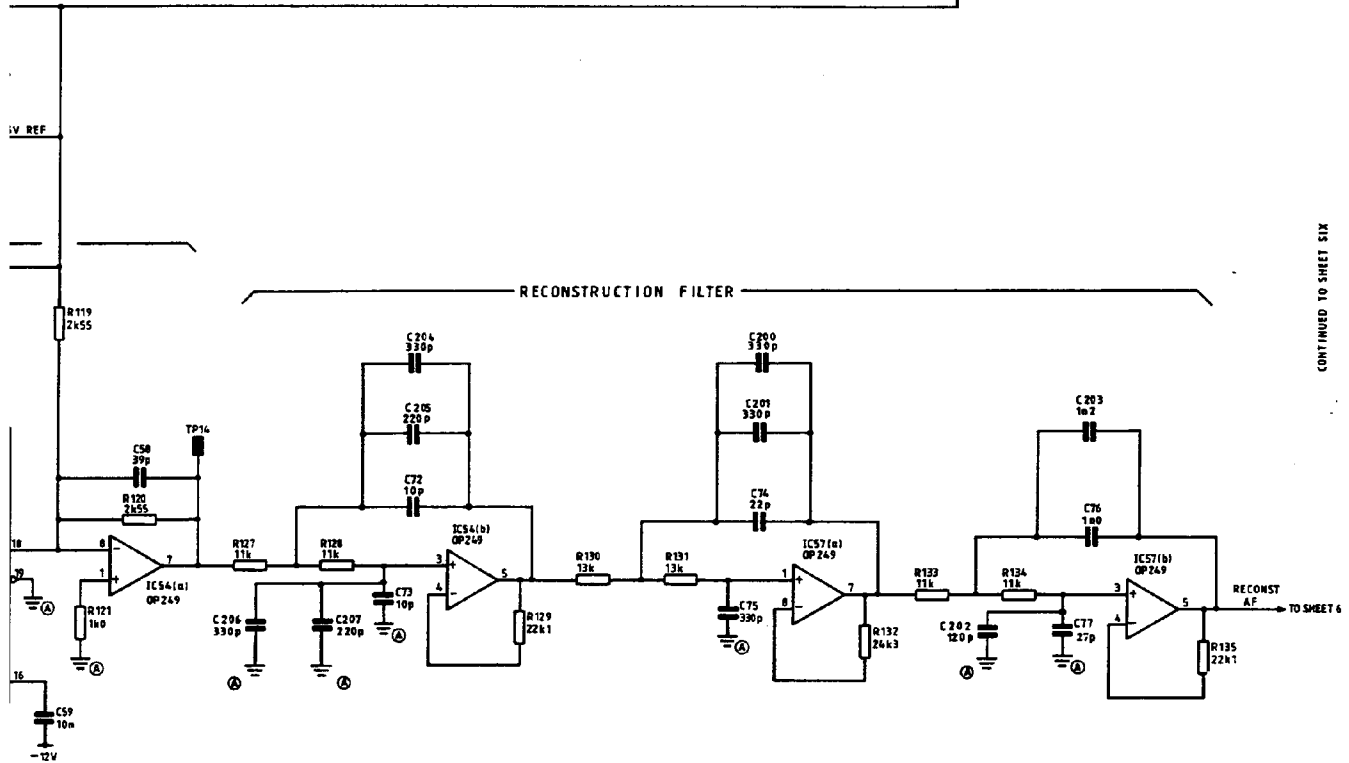
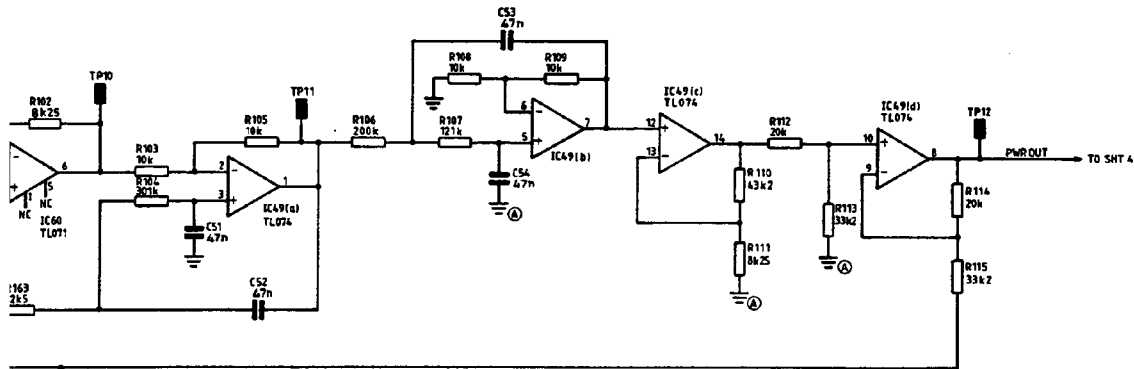
Circuit diagrams **A5/2**

Fig. 7-89 A5/2 Digital signal processor - circuit



Circuit diagrams **A5/2**

## BROADBAND POWER FILTERS

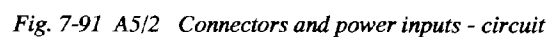


CONTINUED TO SHEET SIX

Fig. 7-90 A5/2 Digital to analogue converters - circuit







PART OF

A5/2

44830/090

DIGITAL SUPPLY PIN CONNECTIONS & DECOUPLING

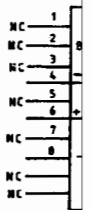
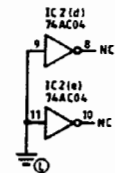
SUPPLY LINE TABLE			
IC No	+5V PIN(S)	0V L PIN(S)	DEC CAP(S)
1	20	10	C101
2	14	7	C102
4	20	10	C106
8	10	20	C108
9	10	20	C109
10	10	20	C110
11	10	20	C111
12	20	10	C112
13	14,52	16,17,56,57	C113, 103
14	32	16	C114
15	18,52	1,35	C115, 104
16	18,52	1,35	C116, 124
17	32	16	C117
18	14	7	C118
19	32	16	C119
20	32	16	C120
21	16	8	C121
25	20	10	C125
26	22,44	43,1	C126, 136
27	8	5	C127
28	32	16	C128
29	20	10	C129
30	32	16	C130
31	20	10	C131
33	28	14	C133
40	28	14	C140
41	28	14	C141
43	18,52	1,35	C143, 139
44	20	10	C144
45	20	10	C145
46	20	10	C146
51	20	10	C151
52	20	10	C152
7	-	-	C107, 168
42	-	-	C142, 169, 170

ANALOGUE SUPPLY PIN CONNECTIONS & DECOUPLING

SUPPLY LINE TABLE				
IC No	+12V PIN	-12V PIN	0V A PIN	
5	17	8	-	
22	4	7	3	
23	2	8	-	
32	7	4	-	
34	13	4	5	
35	6	2	-	
37	4	7	3	
38	7	4	-	
47	18	-	3	
48	7	4	-	
49	4	11	-	
53	20	17	-	
54	6	2	-	
57	6	2	-	
60	7	4	-	

ALL IC'S DECOUPLED AT SUPPLY TO GROUND AS INDICATED  
ALL CAPACITOR VALUES 100n

UNUSED GATES



Circuit diagrams **A5/2**

OF  
A5/2  
0090

ANALOGUE SUPPLY PIN CONNECTIONS & DECOUPLING

SUPPLY LINE TABLE						
IC No	+12V PIN	-12V PIN	0VA PIN	+5V PIN	DECOUPLING	
					+12V	-12V
5	17	8	-	-	C105	C150
22	4	7	3	5	C122	C155
23	2	8	-	-	C123	C156
32	7	4	-	-	C132	C158
34	13	4	5	12	C134	C159
35	6	2	-	-	C135	C160
37	4	7	3	5	C137	C161
38	7	4	-	-	C138	C162
47	18	-	3	-	C147	-
48	7	4	-	-	C148	C163
49	4	11	-	-	C149	C164
53	20	17	-	-	C153	C165
54	6	2	-	-	C154	C166
57	6	2	-	-	C157	C167
60	7	4	-	-	C171	C172

ALL IC'S DECOUPLED AT SUPPLY TO GROUND AS INDICATED  
ALL CAPACITOR VALUES 100n

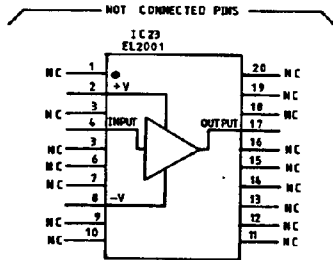
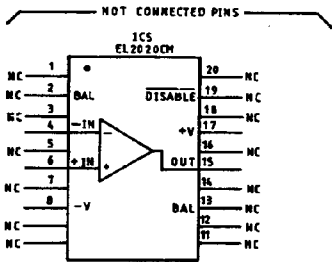
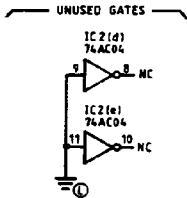
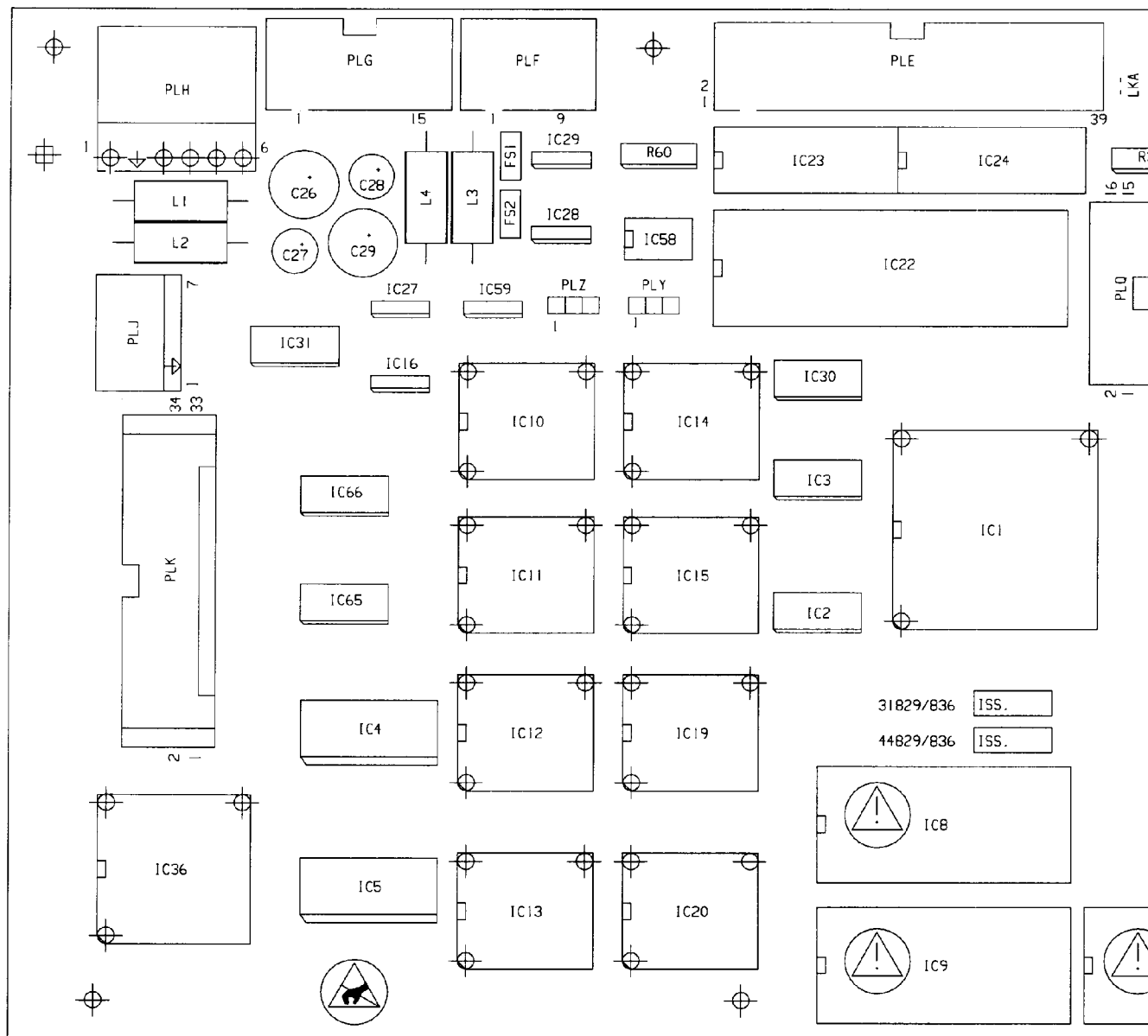


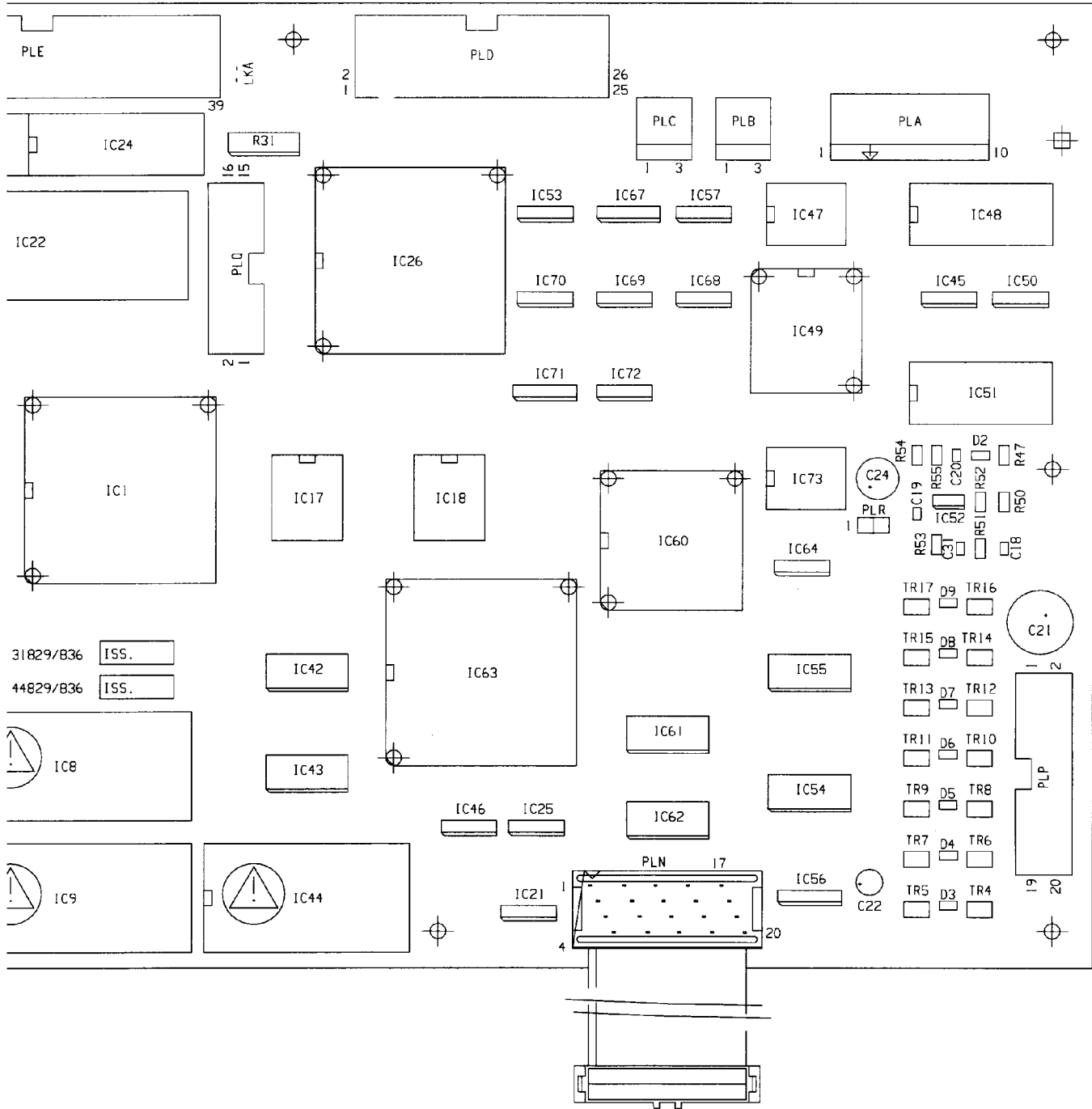
Fig. 7-92 A5/2 Power supply and decoupling arrangements



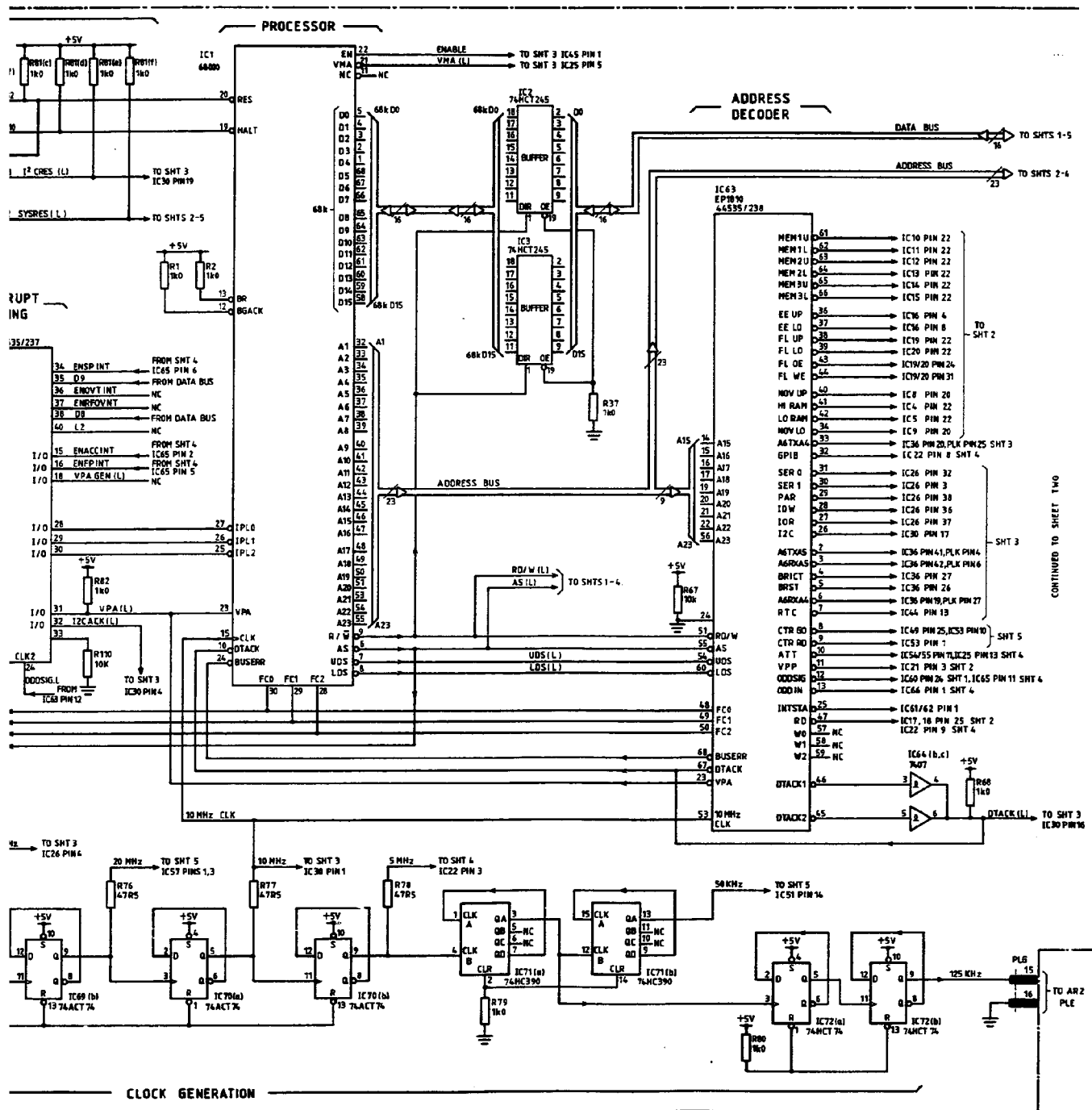
Power supply and decoupling arrangements **A5/2**

Drg. No. 44829/836

## Component layout A6





Circuit diagrams **A6**

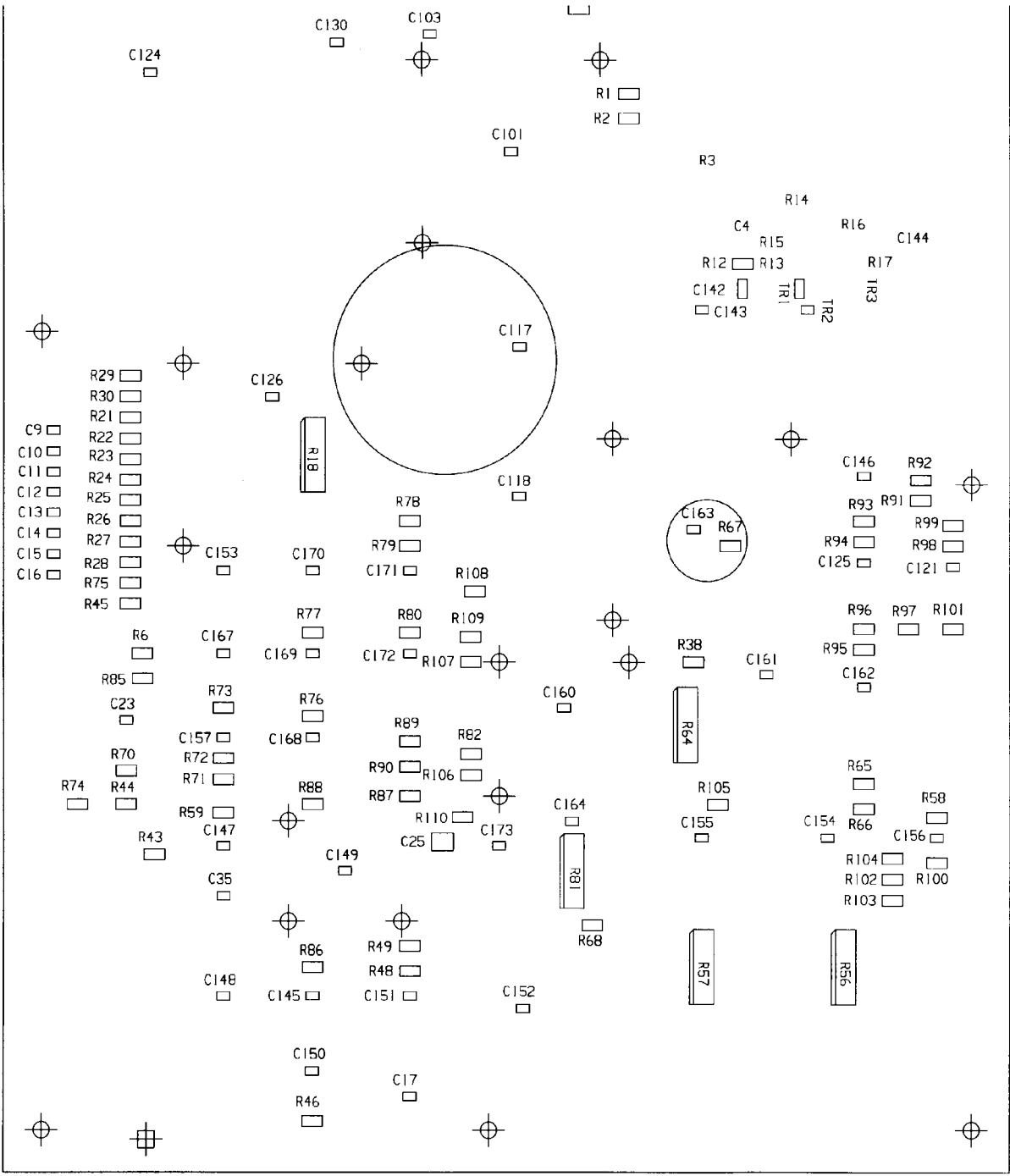
CONTINUED TO SHEET TWO

Fig. 7-94 A6 CPU - circuit





# Component layout A6

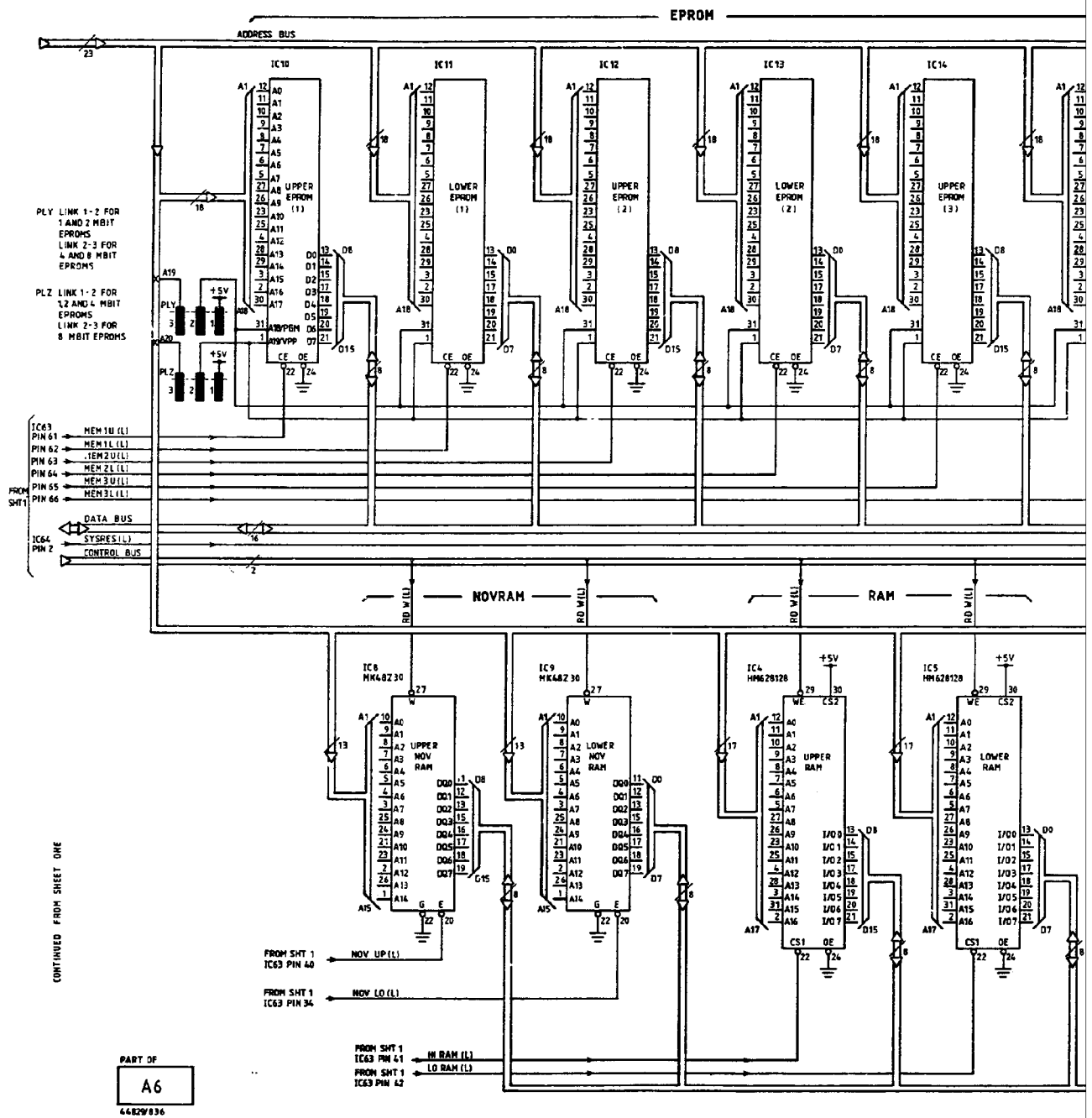


A6

Dwg. No. 44829/836 Sheet 2 of 2 Issue 5

Fig. 7-95 A6 CPU - component layout, solder side

46882-168



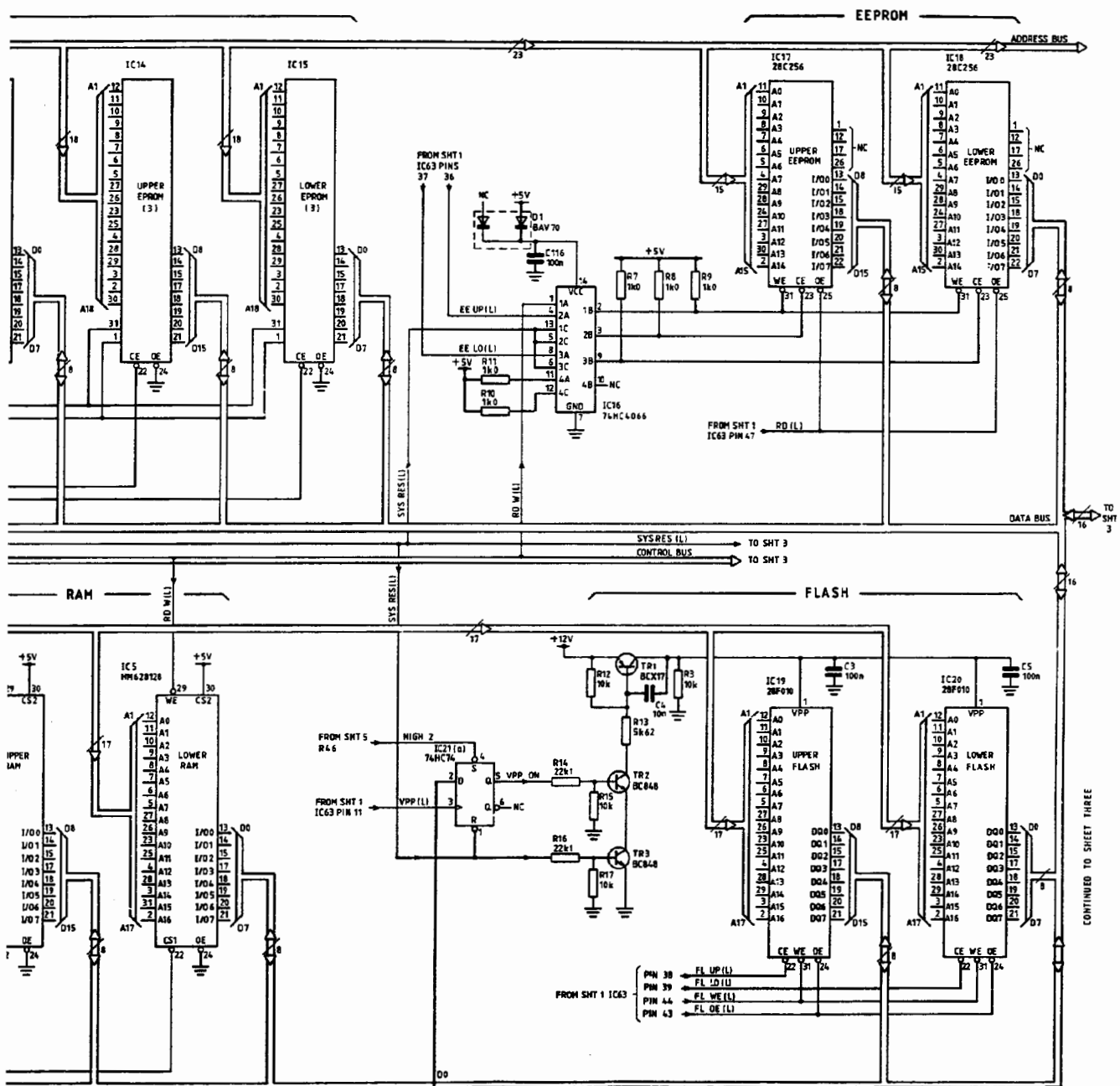
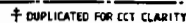
Circuit diagrams **A6**

Fig. 7-96 A6 EPROM, EEPROM, RAM, Flash memory - circuit

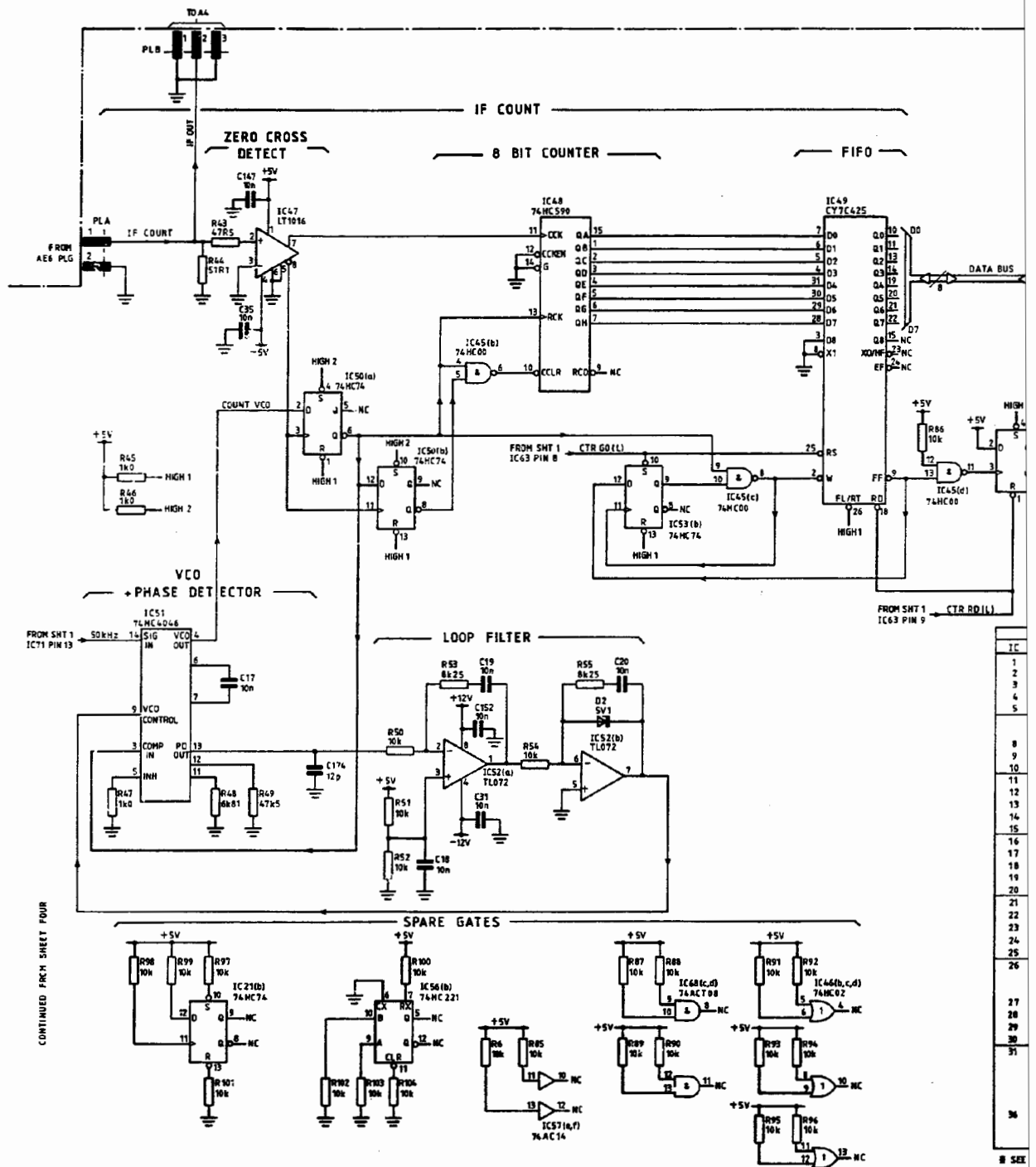




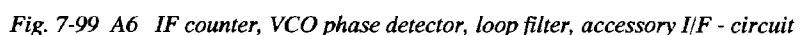
TO SIG GEN STE. ATTENUATOR



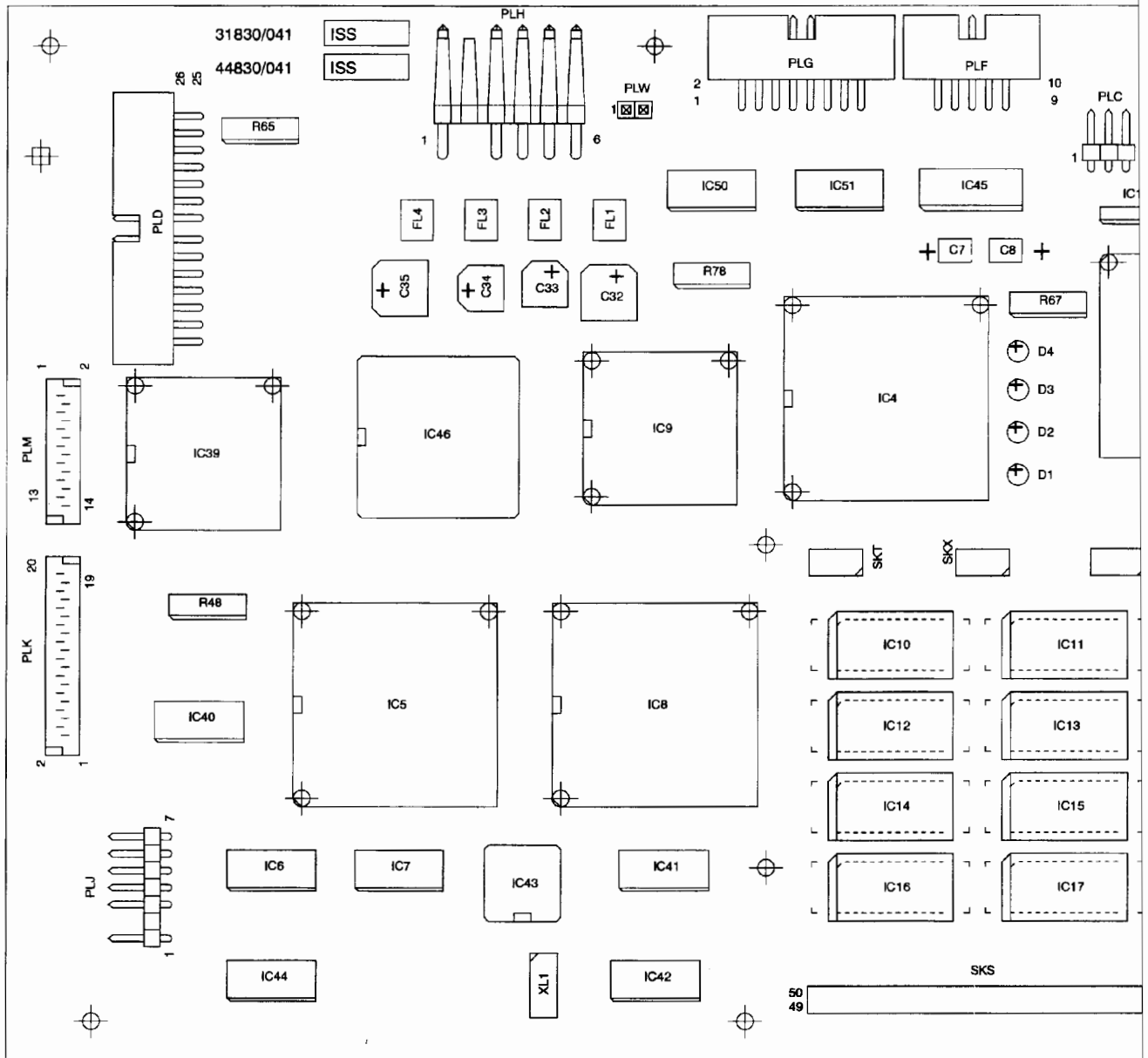








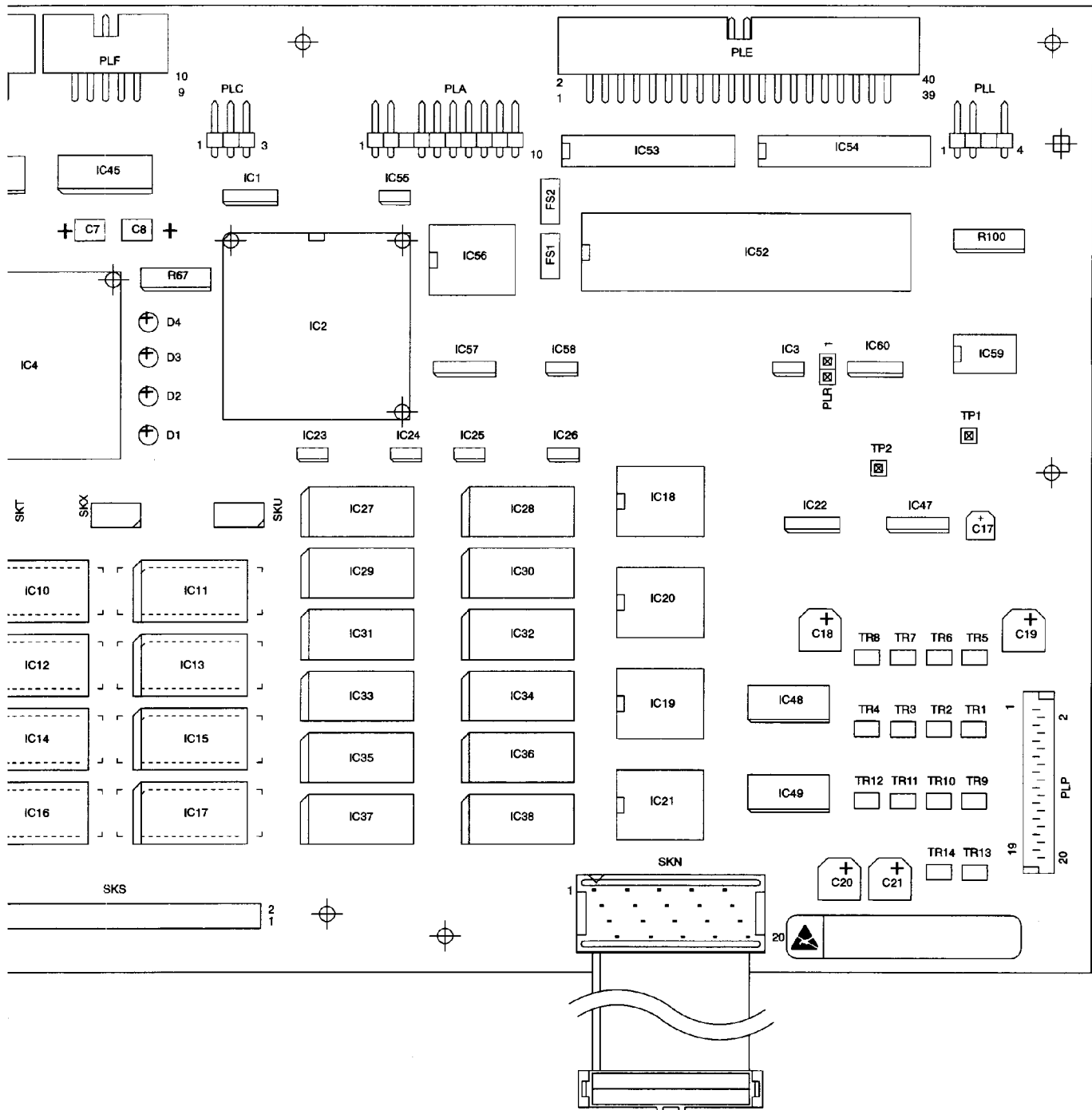
# SERVICING DIAGRAMS



IF counter, VCO phase detector, loop filter, accessory I/F **A6**

Drg. No. 44830/04

## Component layout **A6/2**



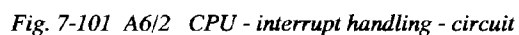
**A6**

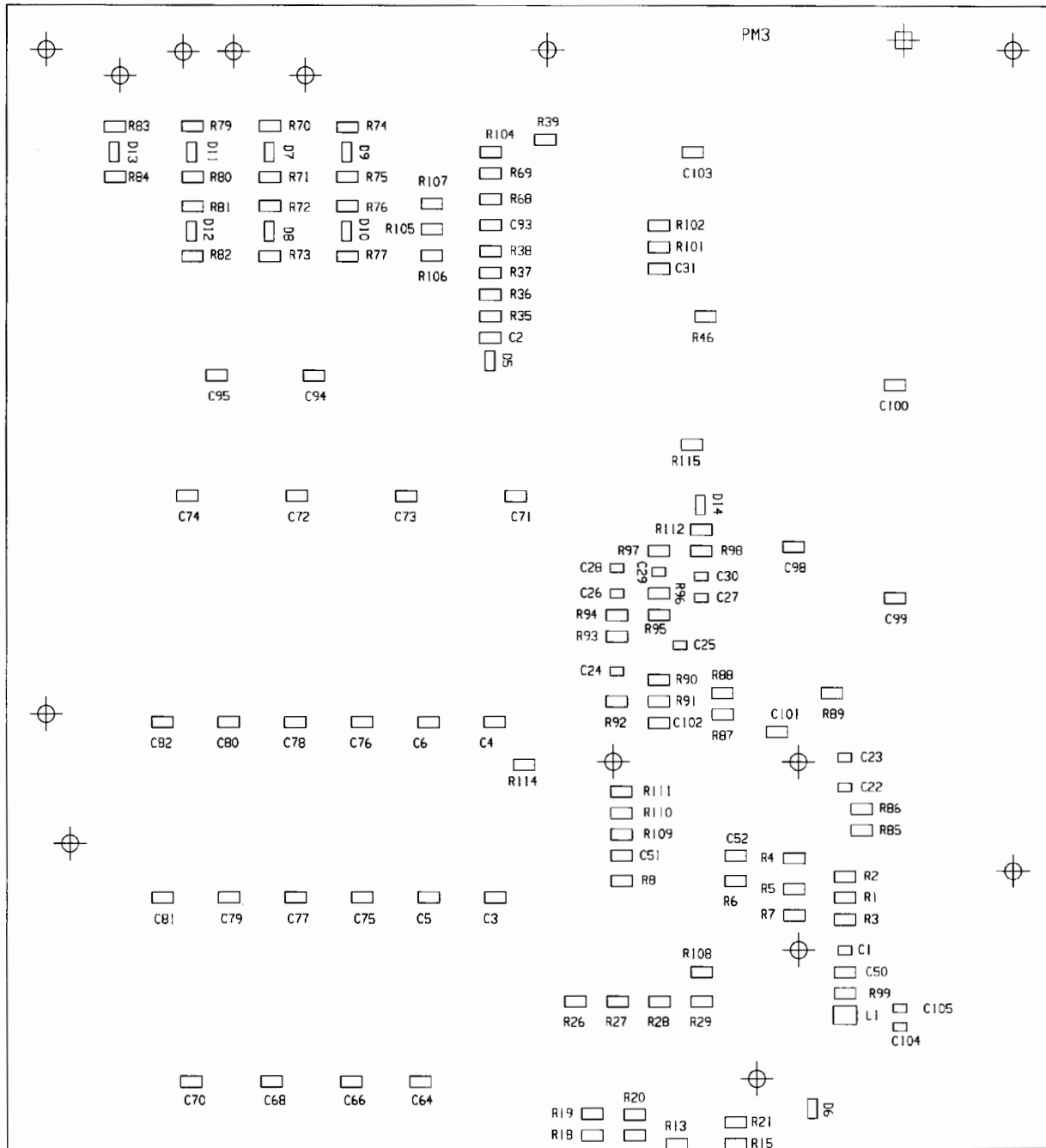
Drg. No. 44830/041 Sheet 1 of 2 Issue 6

Fig. 7-100 A6/2 CPU - component layout, component side

46882-168



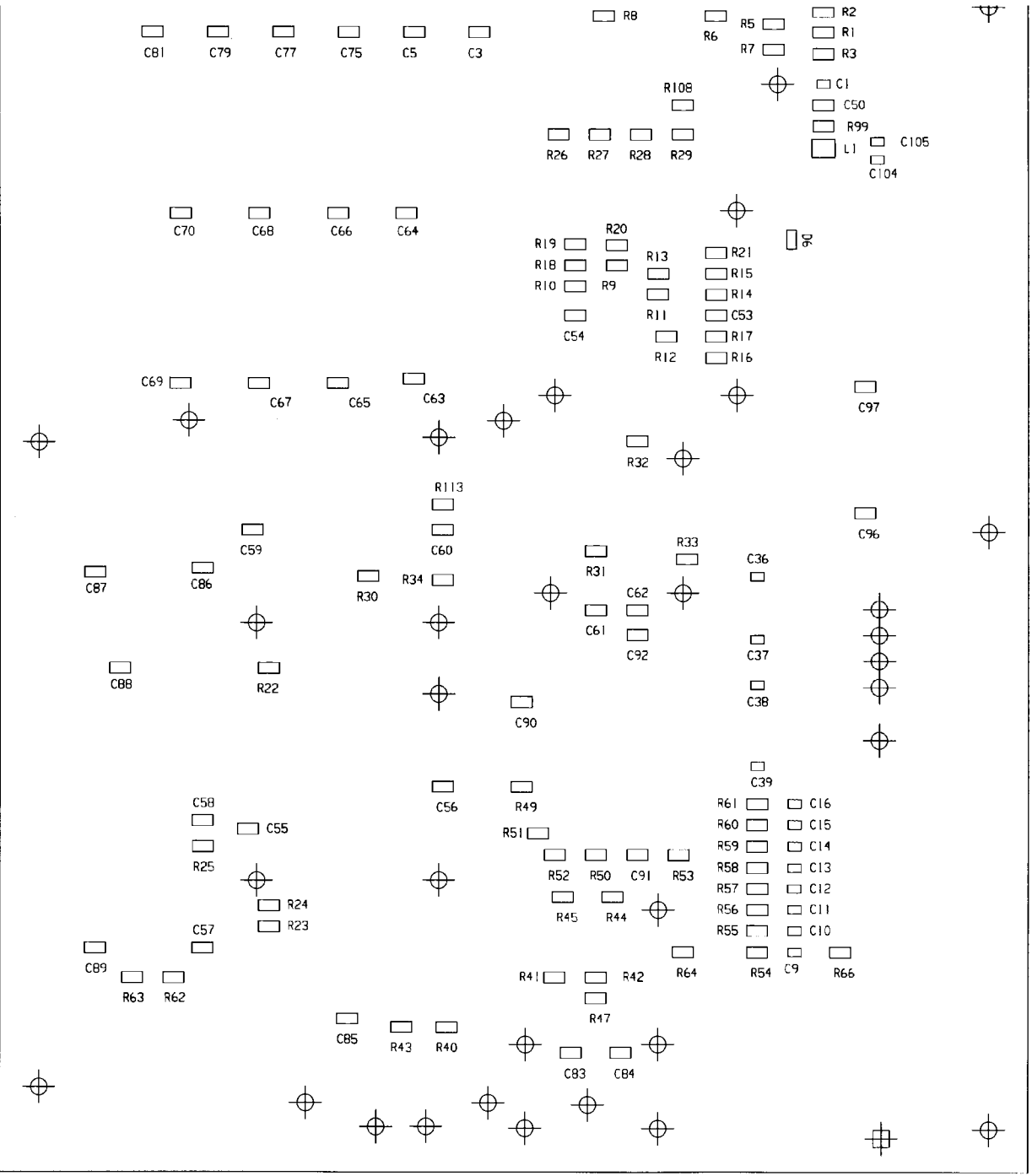




CPU, interrupt handling A6/2

Dwg. No. 44630/04

# Component layout **A6/2**



**A6/2**

Dwg. No. 44830/041 Sheet 2 of 2 Issue 6

Fig. 7-102 A6/2 CPU - component layout, solder side

46882-168





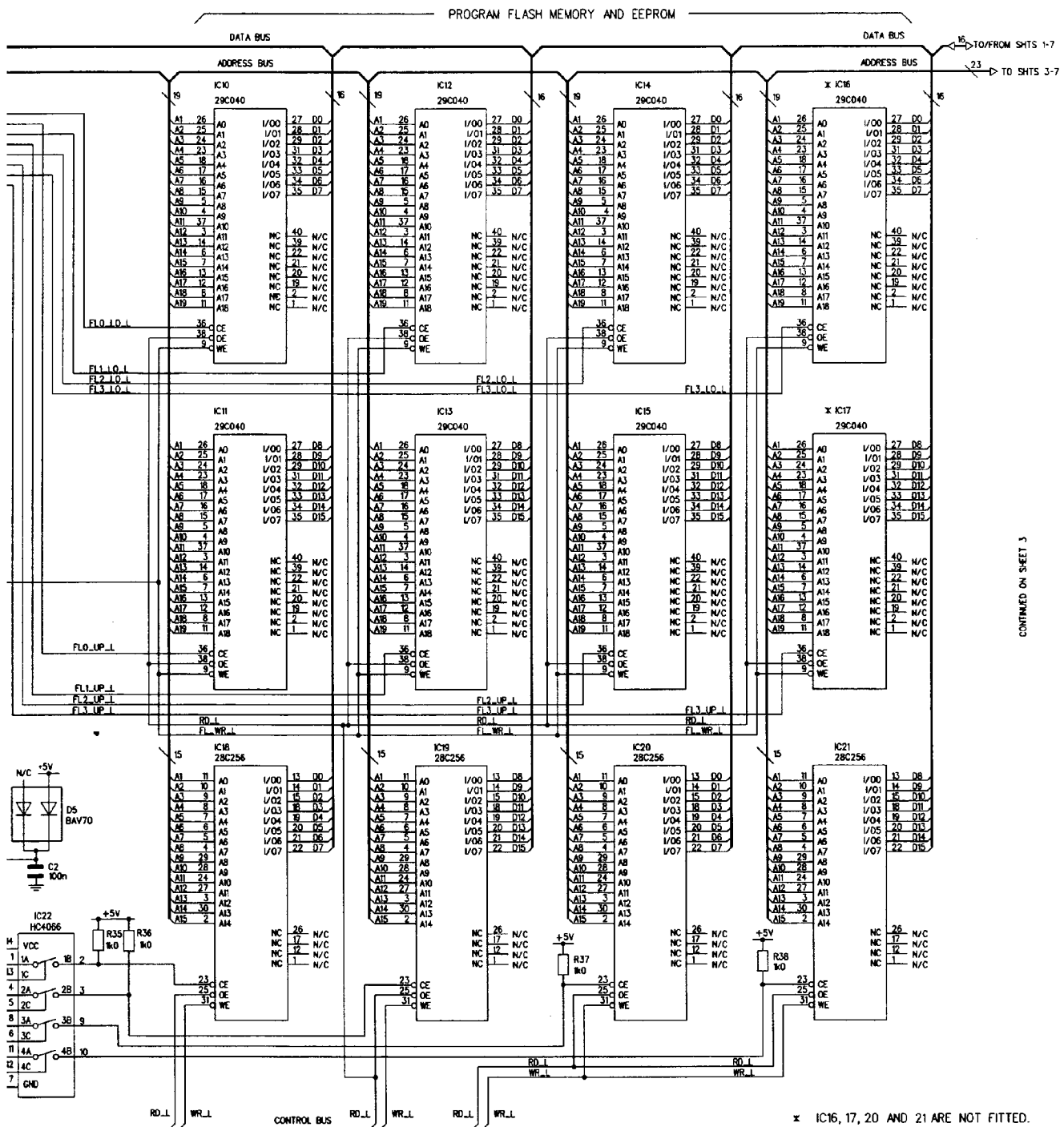
Circuit diagrams **A6/2**

Fig. 7-103 A6/2 Decoding, Flash memory, EEPROM - circuit



# Circuit diagrams A6/2

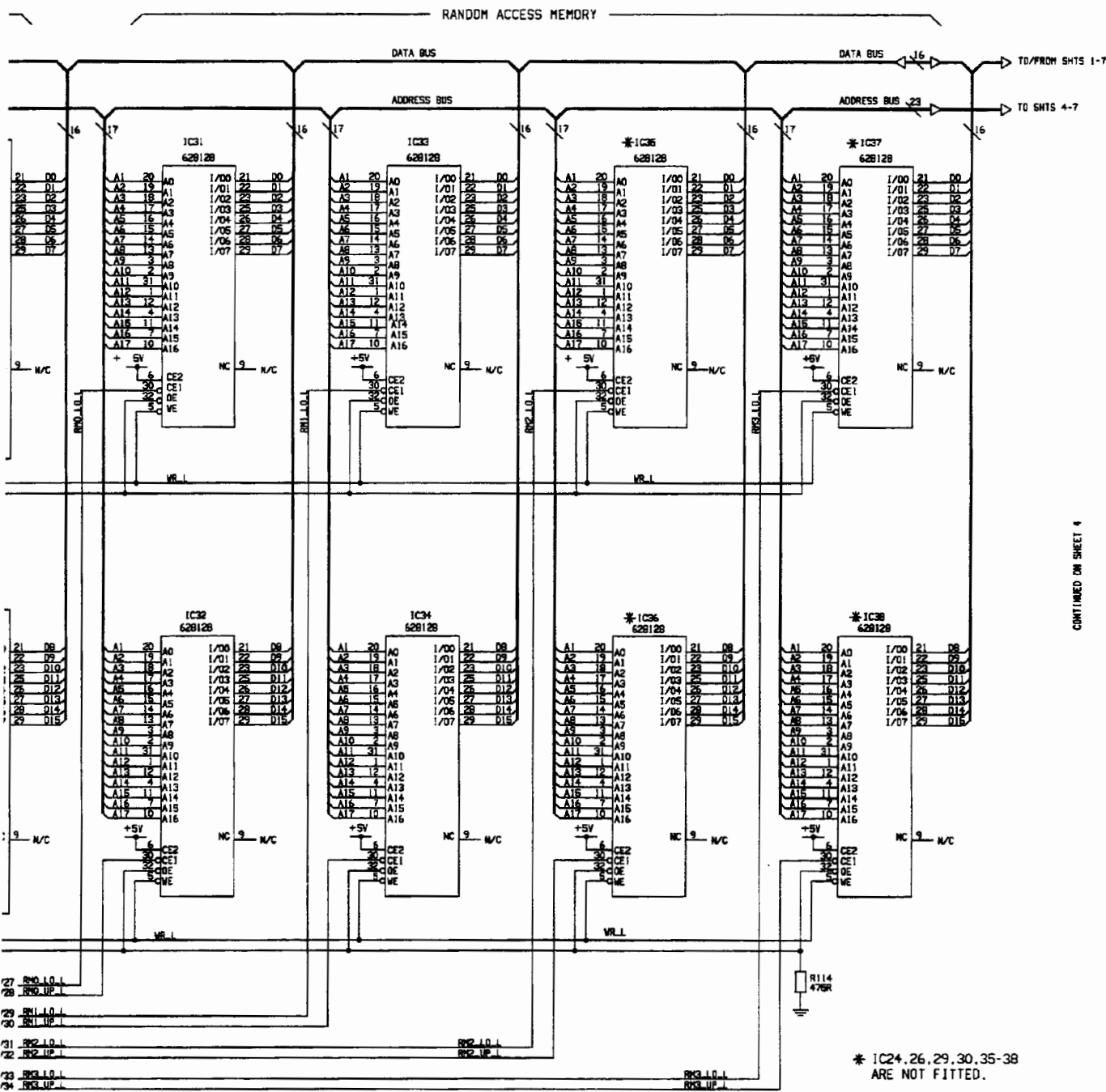


Fig. 7-104 A6/2 Random access memory - circuit



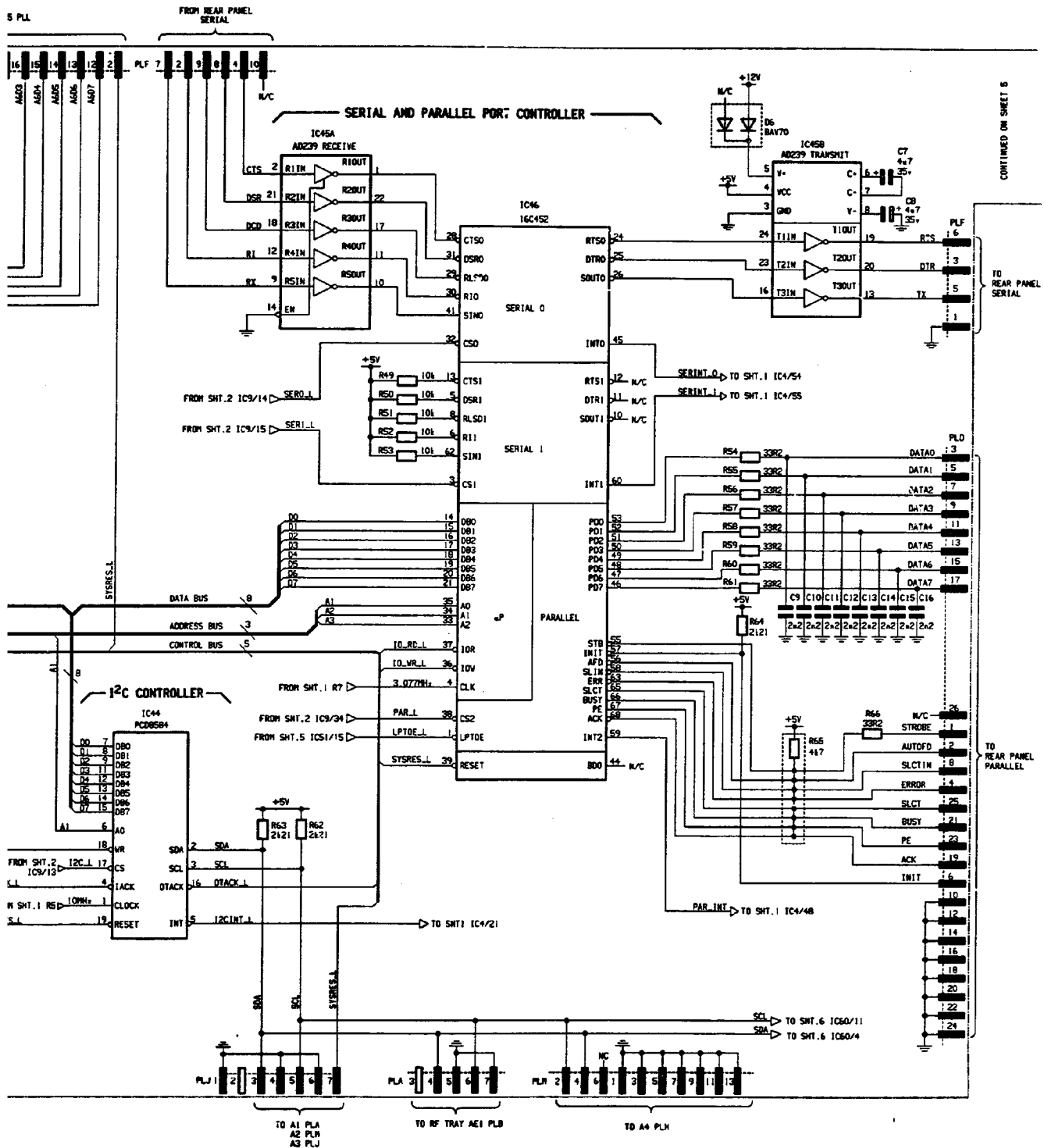
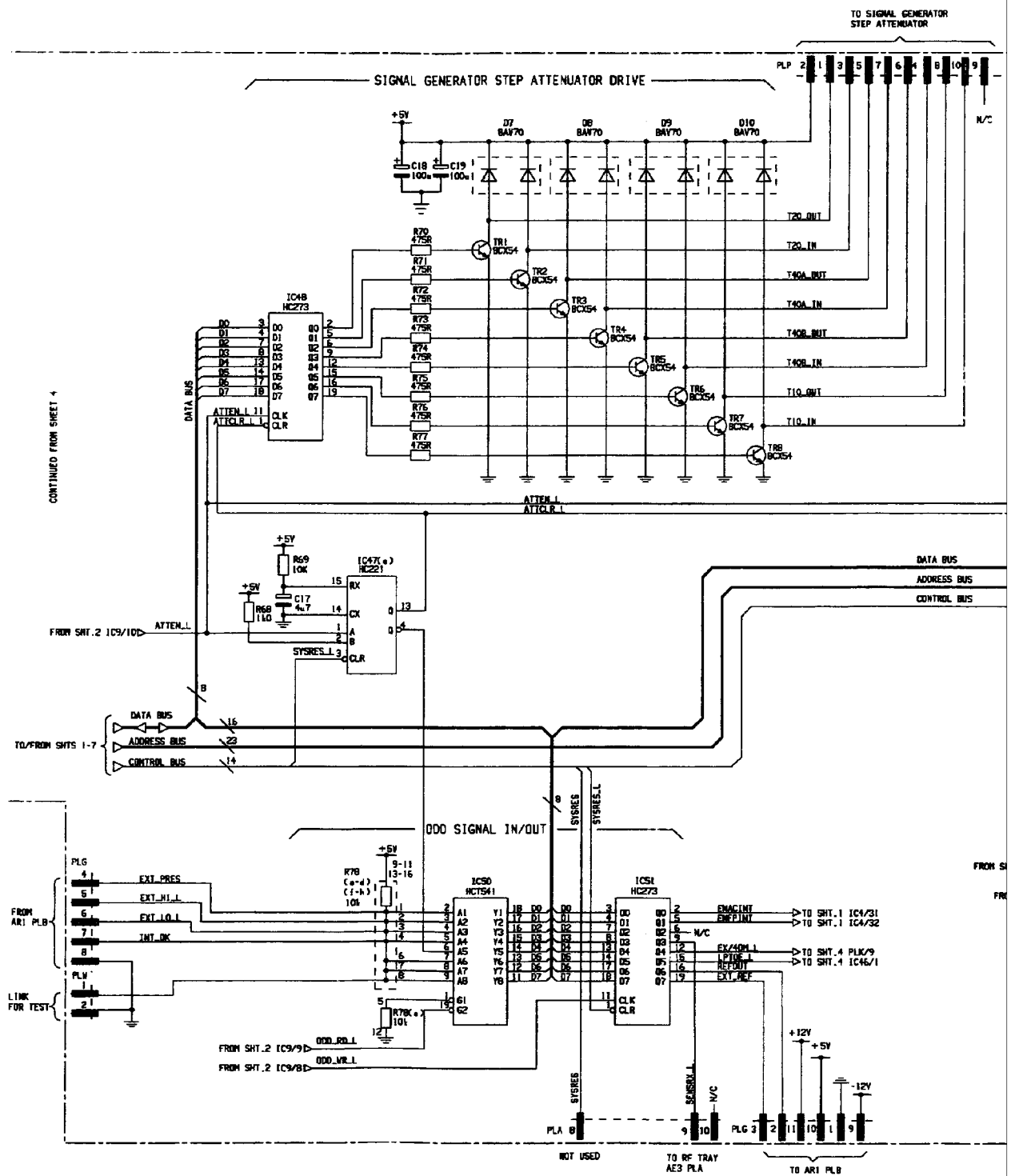
Circuit diagrams **A6/2**

Fig. 7-105 A6/2 A4/A5 bridge, serial/parallel port controller, real-time clock - circuit



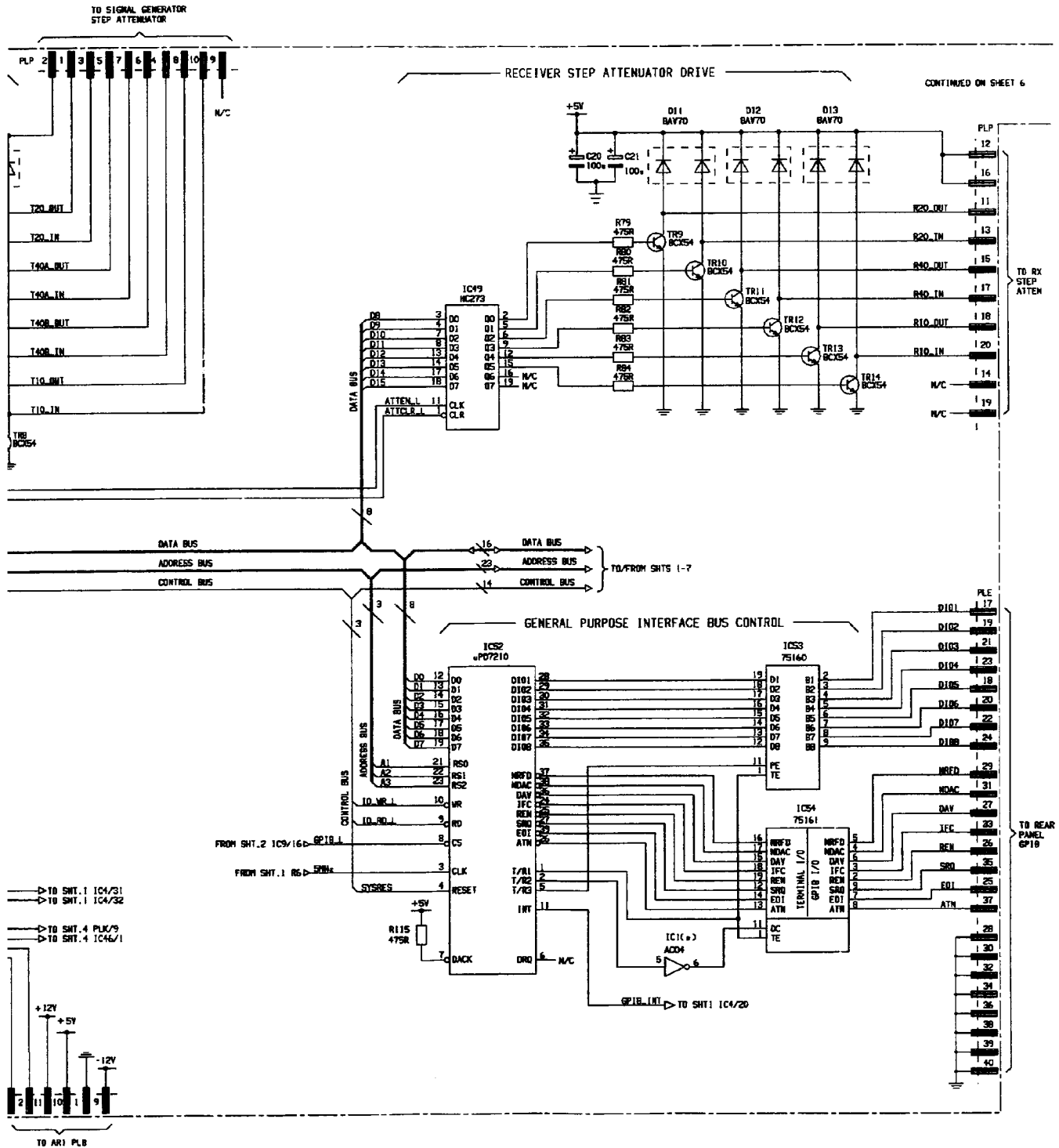
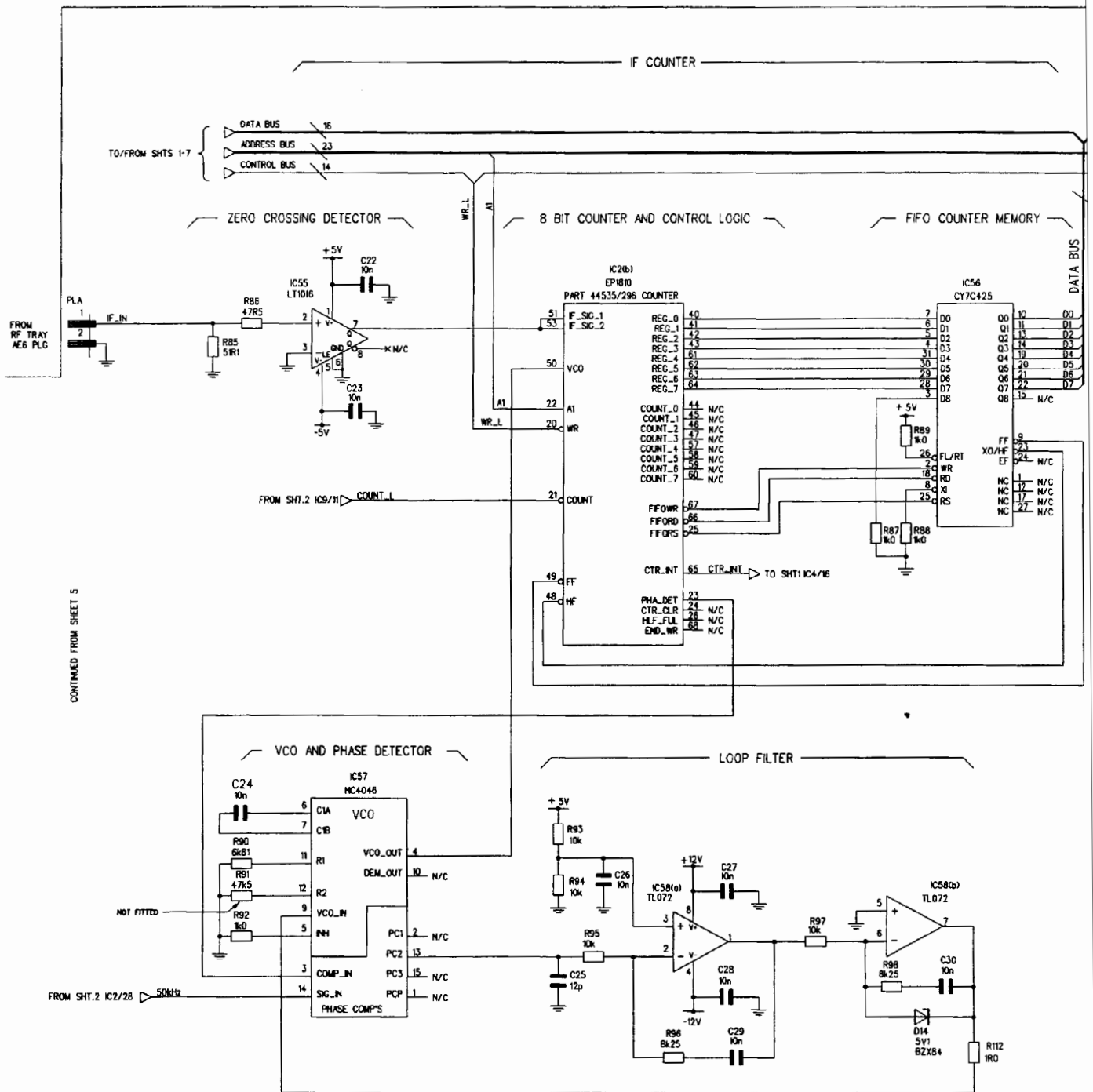
Circuit diagrams **A6/2**

Fig. 7-106 A6/2 Step attenuator drive, ODD signal I/O, GP I/F bus control - circuit





Circuit diagrams **A6/2**

CONTINUED ON SHEET 7

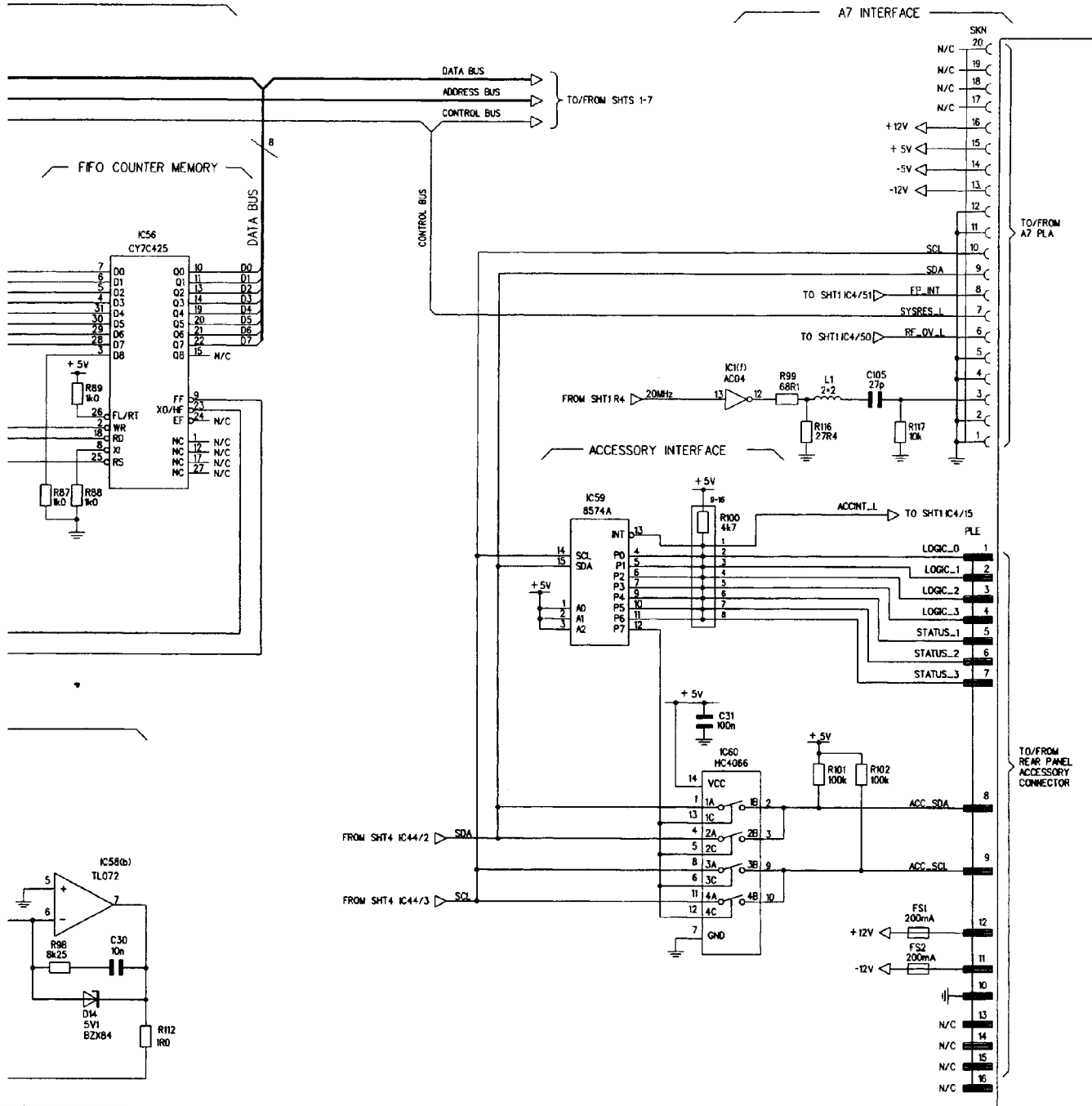
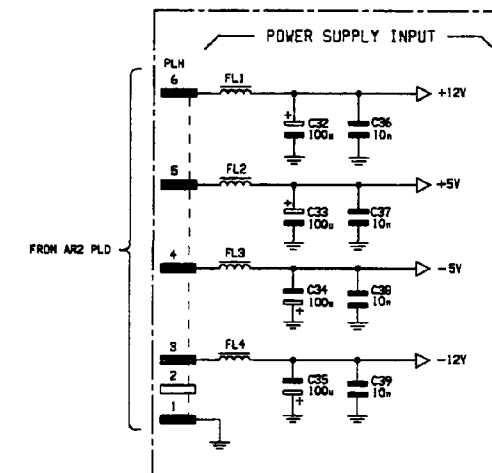


Fig. 7-107 A6/2 IF counter, VCO &amp; phase detector, loop filter, accessory I/F - circuit



SUPPLY LINE TABLE				
IC	TYPE	+5V PINS	GND PINS	DECOUPLING CAPACITOR
1	74AC14	14	7	C50
2	44635/296	18, 52	1, 35	C51, 52
4	44635/298	18, 52	1, 35	C53, 54
5	68000	14, 52	15, 17, 56, 57	C55, 56
6	74HCT245	20	10	C57
7	74HCT245	20	10	C58
8	44635/294	18, 52	1, 35	C59, 60
9	44635/295	1, 44	22, 23	C61, 62
10	29CD40	10	30	C63
11	29CD40	10	30	C64
12	29CD40	10	30	C65
13	29CD40	10	30	C66
14	29CD40	10	30	C67
15	29CD40	10	30	C68
16	29CD40	10	30	C69
17	29CD40	10	30	C70
18	28C256	32	16	C71
19	28C256	32	16	C72
20	28C256	32	16	C73
21	28C256	32	16	C74
31	628128	8	24	C75
32	628128	8	24	C76
33	628128	8	24	C77
34	628128	8	24	C78
35	628128	8	24	C79
36	628128	8	24	C80
37	628128	8	24	C81
38	628128	8	24	C82
39	44635/297	1, 44	22, 23	C83, 84
40	74HCT245	20	10	C85
41	74HCT245	20	10	C86
42	74HCT541	20	10	C87
43	DS12850	28	15	C88
44	PCD8594	20	10	C89
46	16C452	23, 40, 64	2, 7, 9, 22, 27, 42, 43, 54, 61	C90, 91, 92
47	74HC221	16	8	C93
48	74HC273	20	10	C94
49	74HC273	20	10	C95
50	74HCT541	20	10	C96
51	74HC273	20	10	C97
52	μP07210	40	20	C98
53	75160	20	10	C99
54	75161	20	10	C100
56	CY7CA25	32	16	C101
57	74HC4046	16	8	C102
59	8574A	16	8	C103

IC'S ARE DECOUPLED AT +5V TO GROUND BY A 100n CAPACITOR AS INDICATED

Circuit diagrams **A6/2**

DECOUPLING CAPACITOR
C50
C51.52
C53.54
C55.56
C57
C58
C59.60
C61.62
C63
C64
C65
C66
C67
C68
C69
C70
C71
C72
C73
C74
C75
C76
C77
C78
C79
C80
C81
C82
C83.84
C85
C86
C87
C88
C89
C90.91.92
C93
C94
C95
C96
C97
C98
C99
C100
C101
C102
C103

OR AS INDICATED

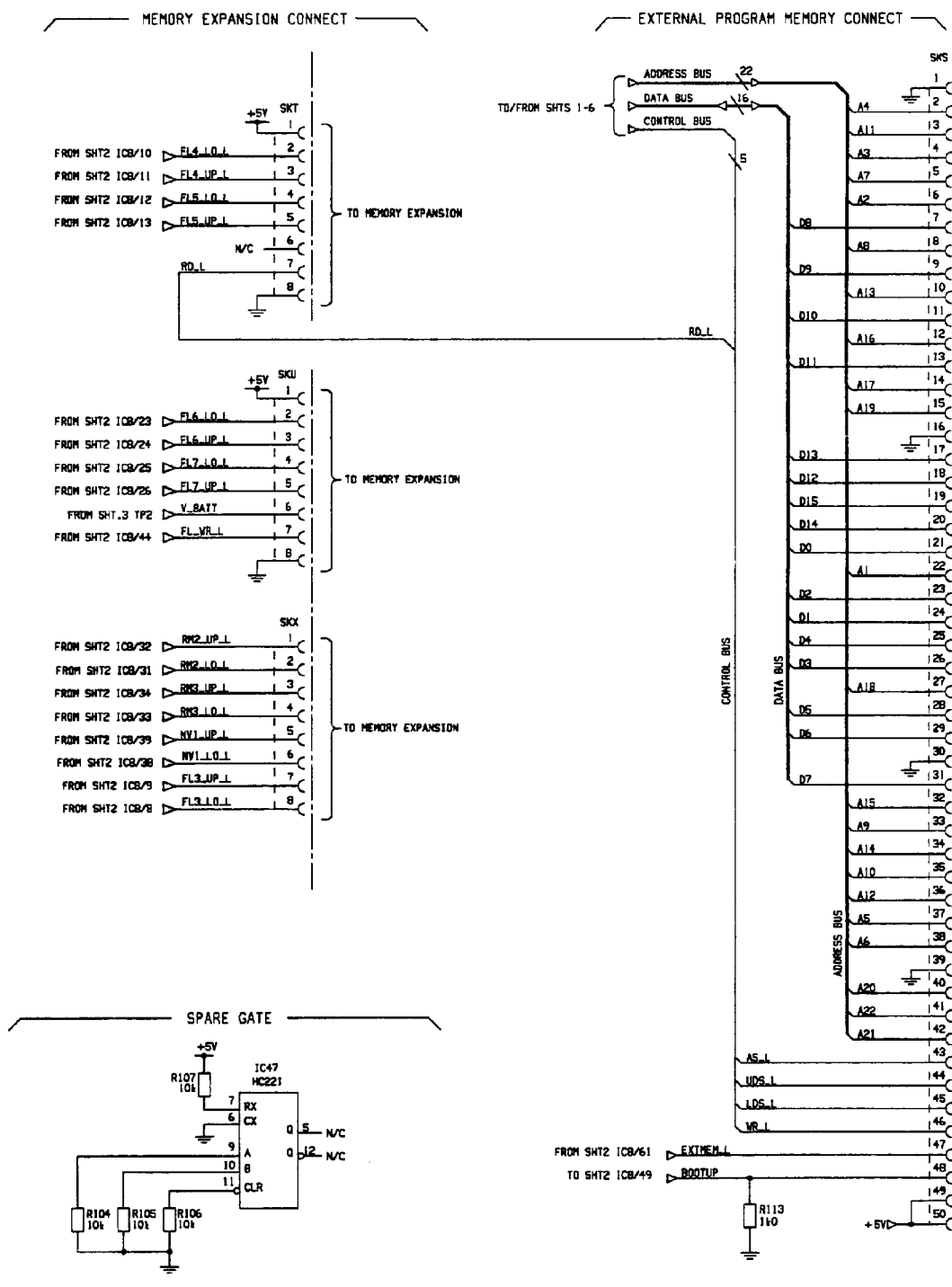
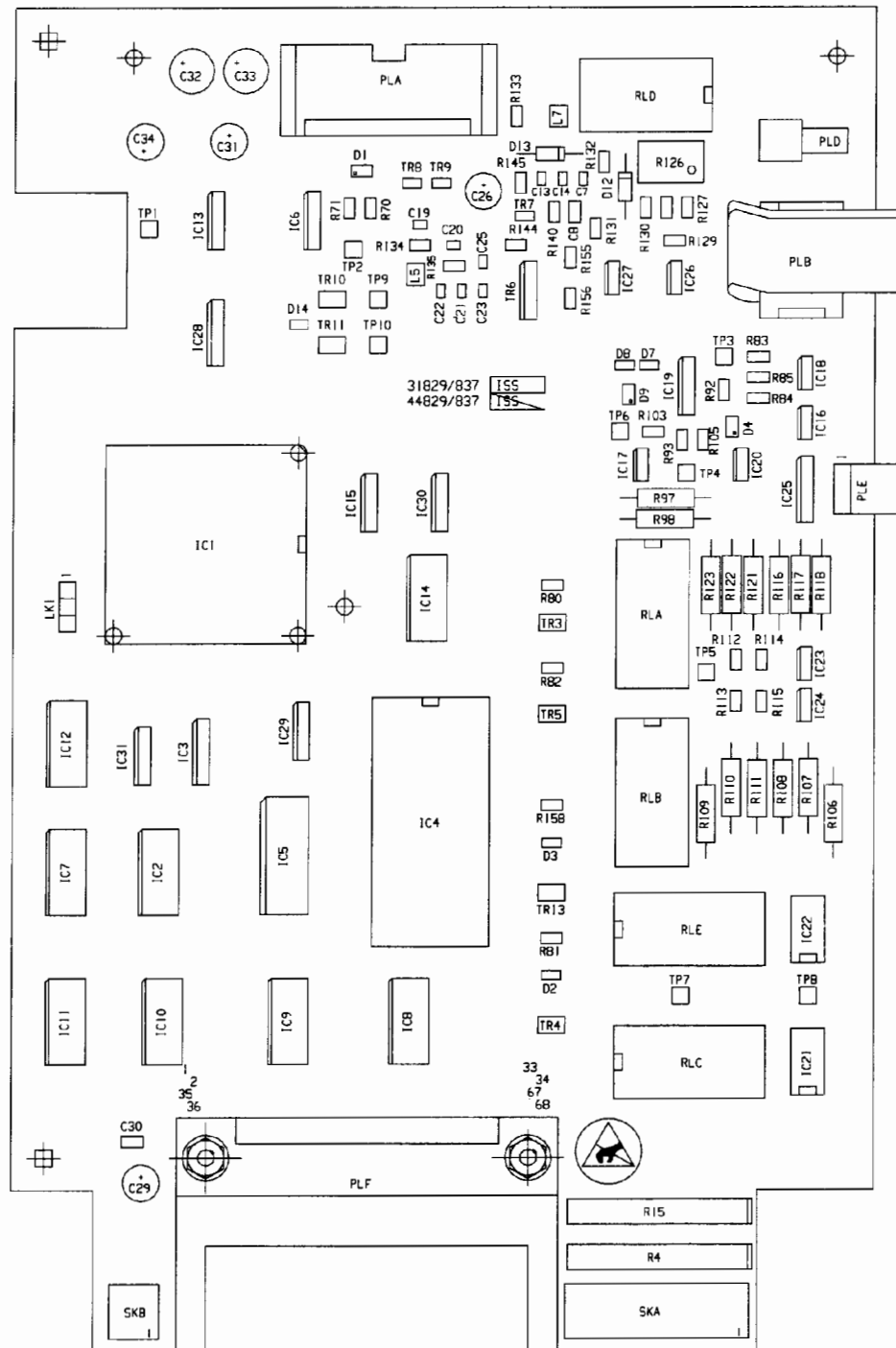


Fig. 7-108 A6/2 Power supply and decoupling, memory connect - circuit

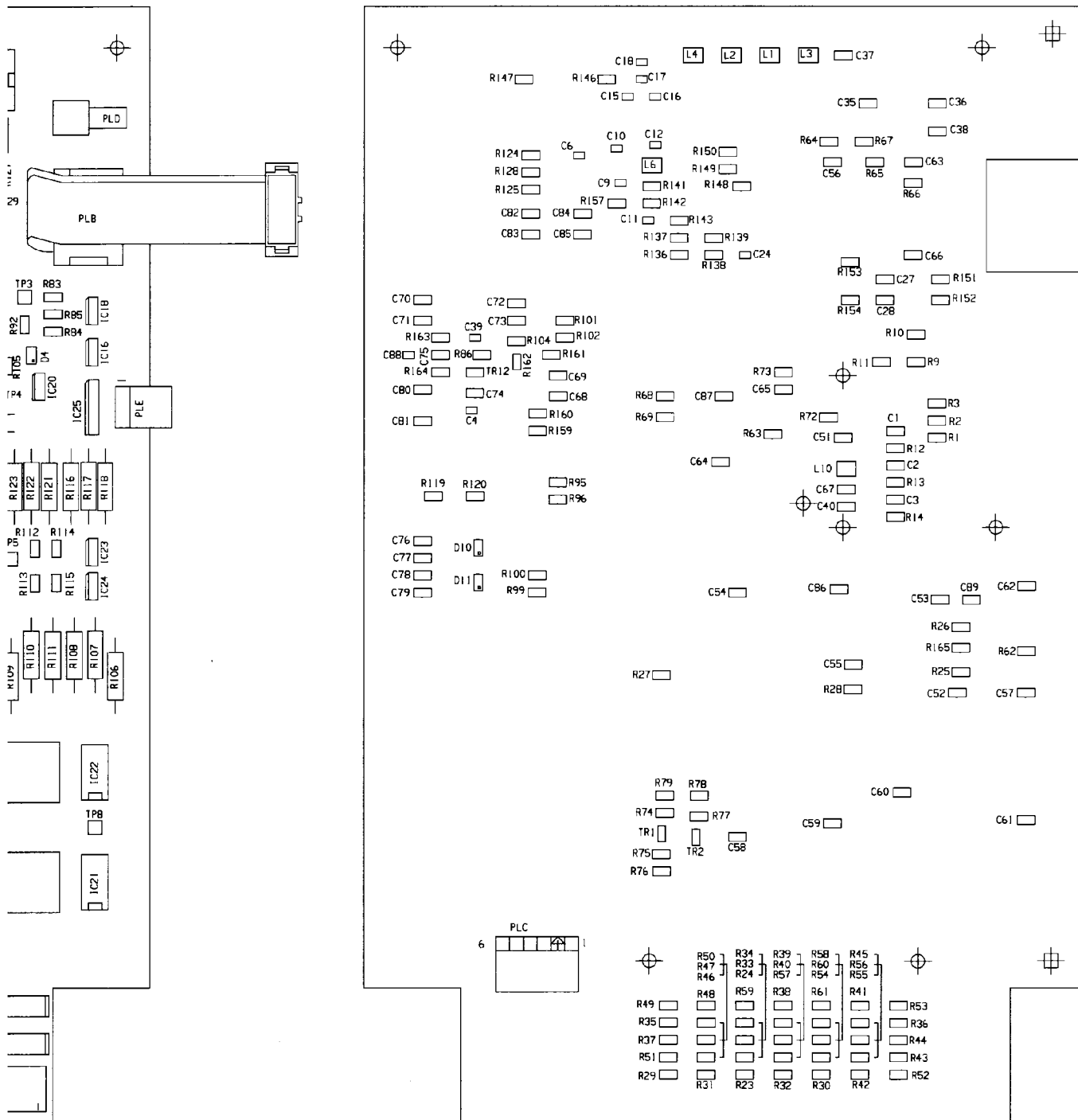
## SERVICING DIAGRAMS



## Power supply and decoupling, memory connect A6/2

Drg. No. 44829/83

# Component layout A7





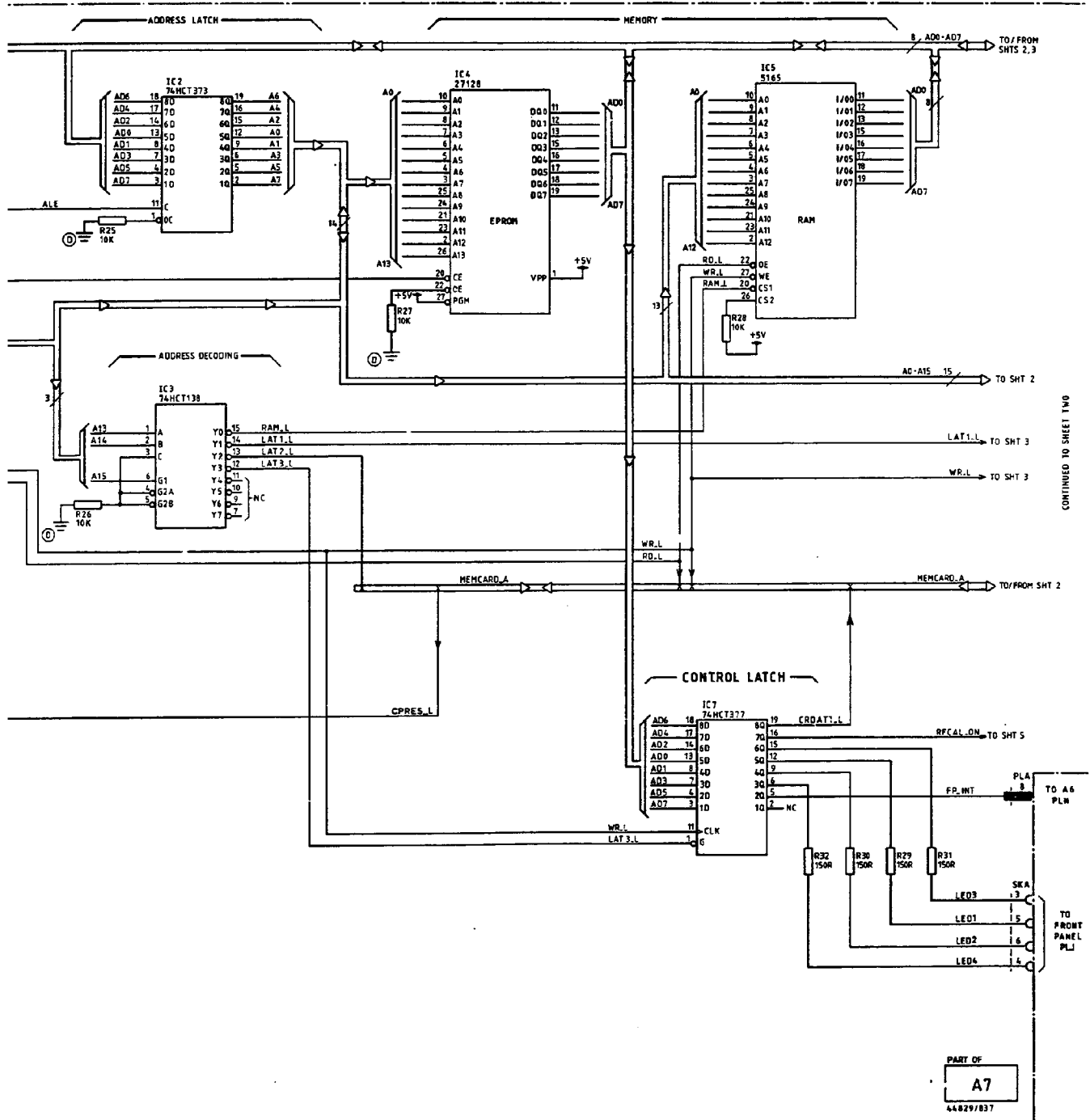
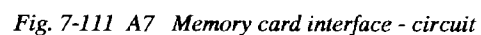
Circuit diagrams **A7**

Fig. 7-110 A7 Microcontroller - circuit









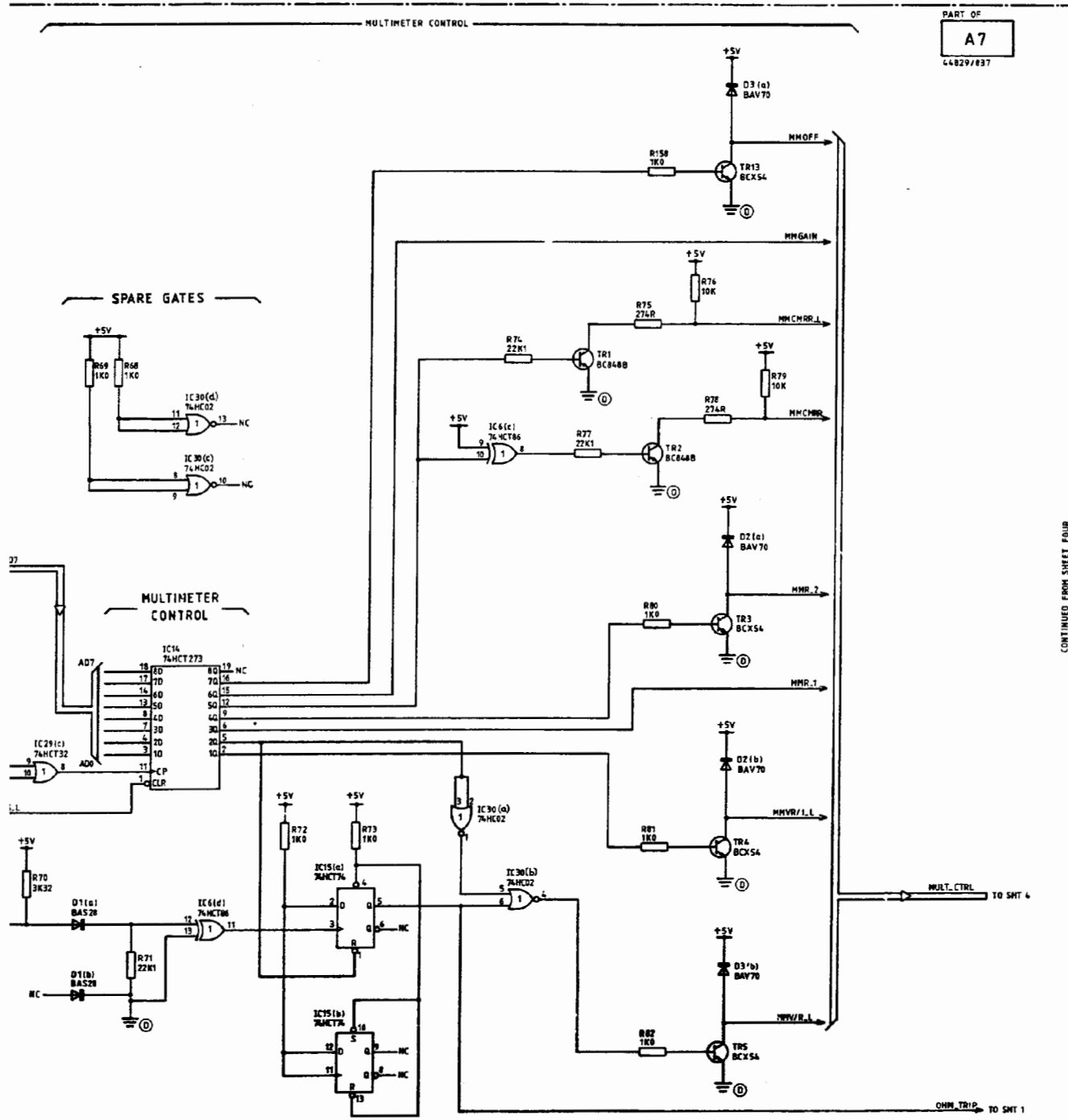
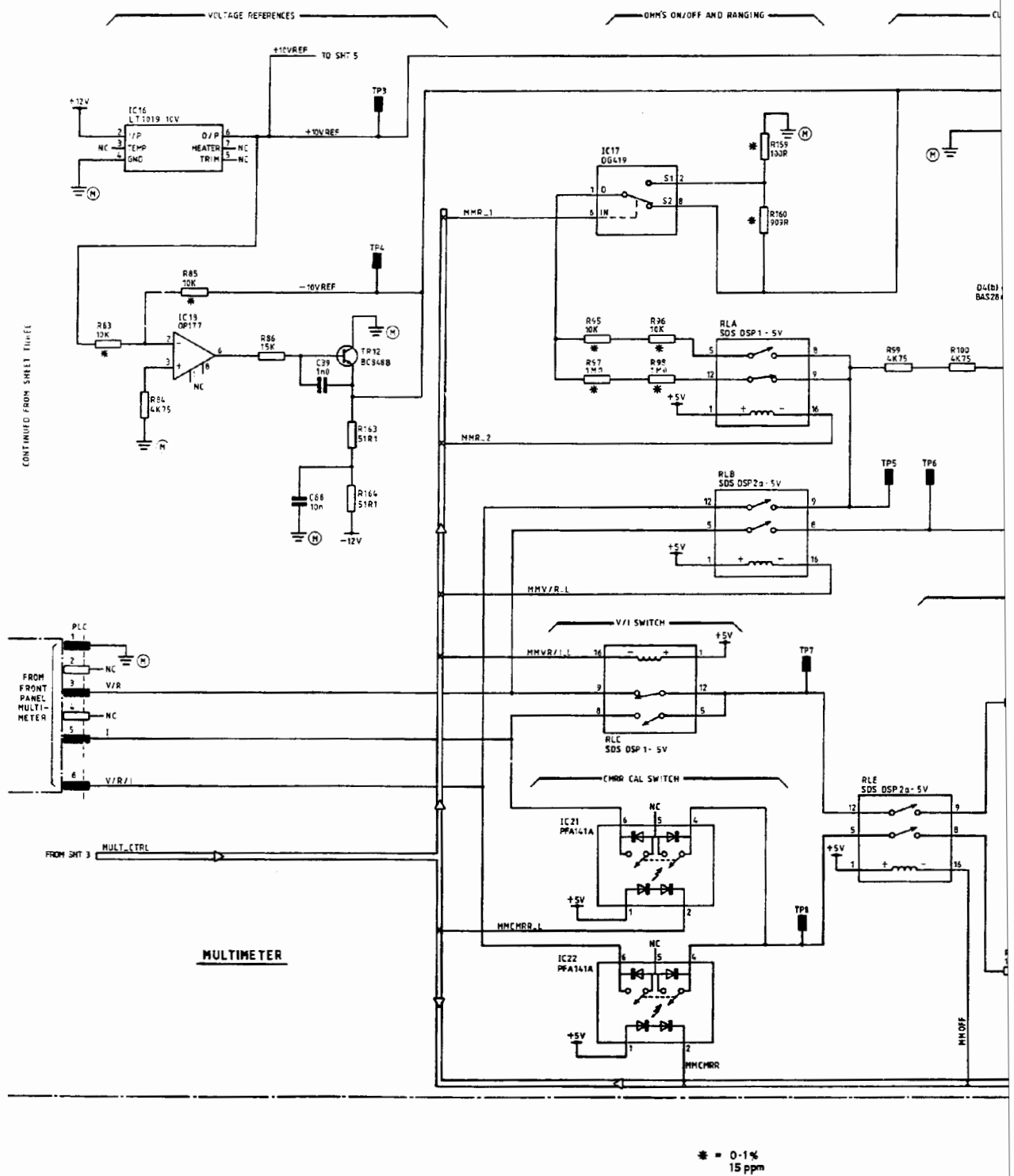
Circuit diagrams **A7**

Fig. 7-112 A7 Clock buffer and dividers, multimeter control, PS I/O - circuit



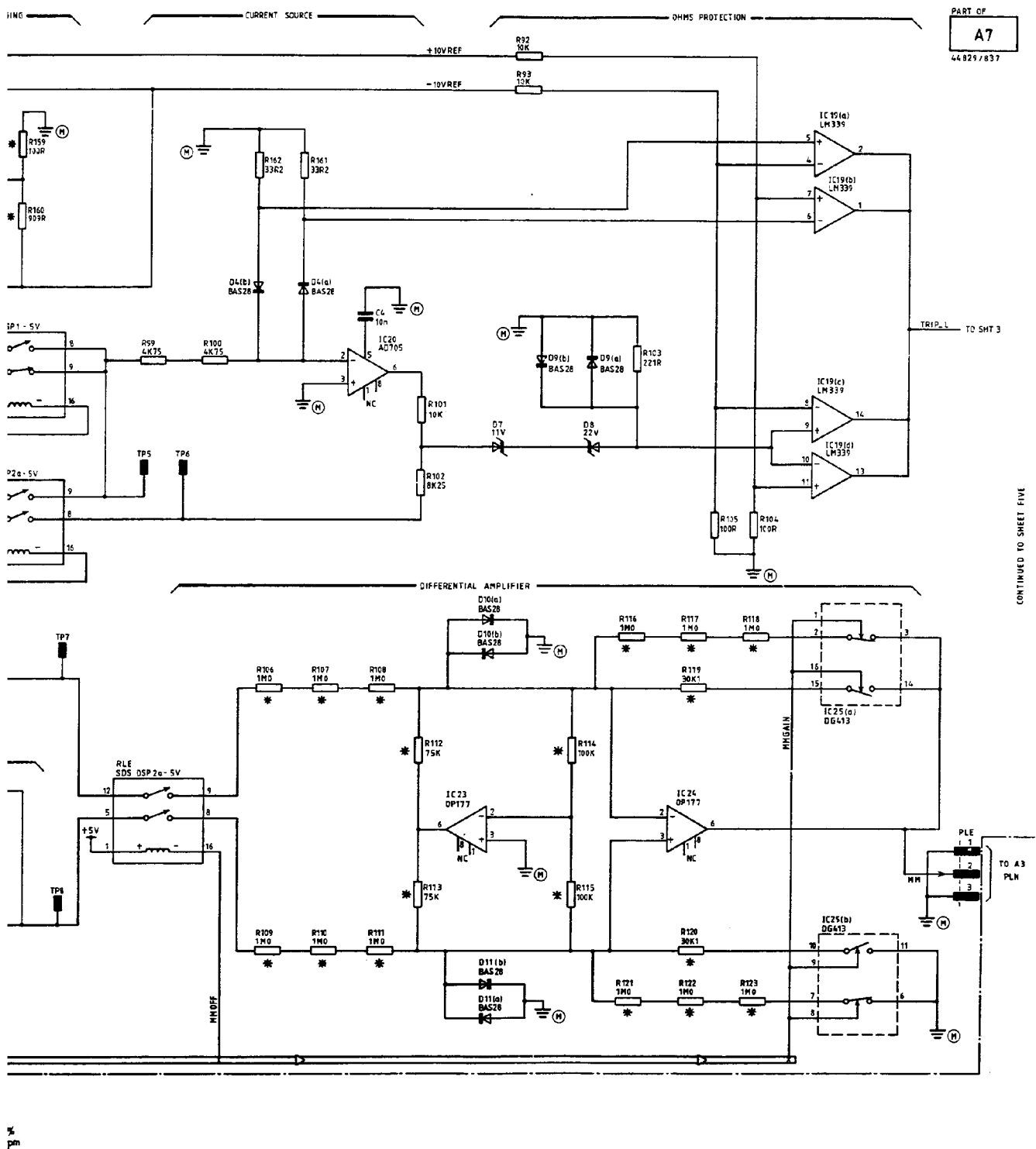
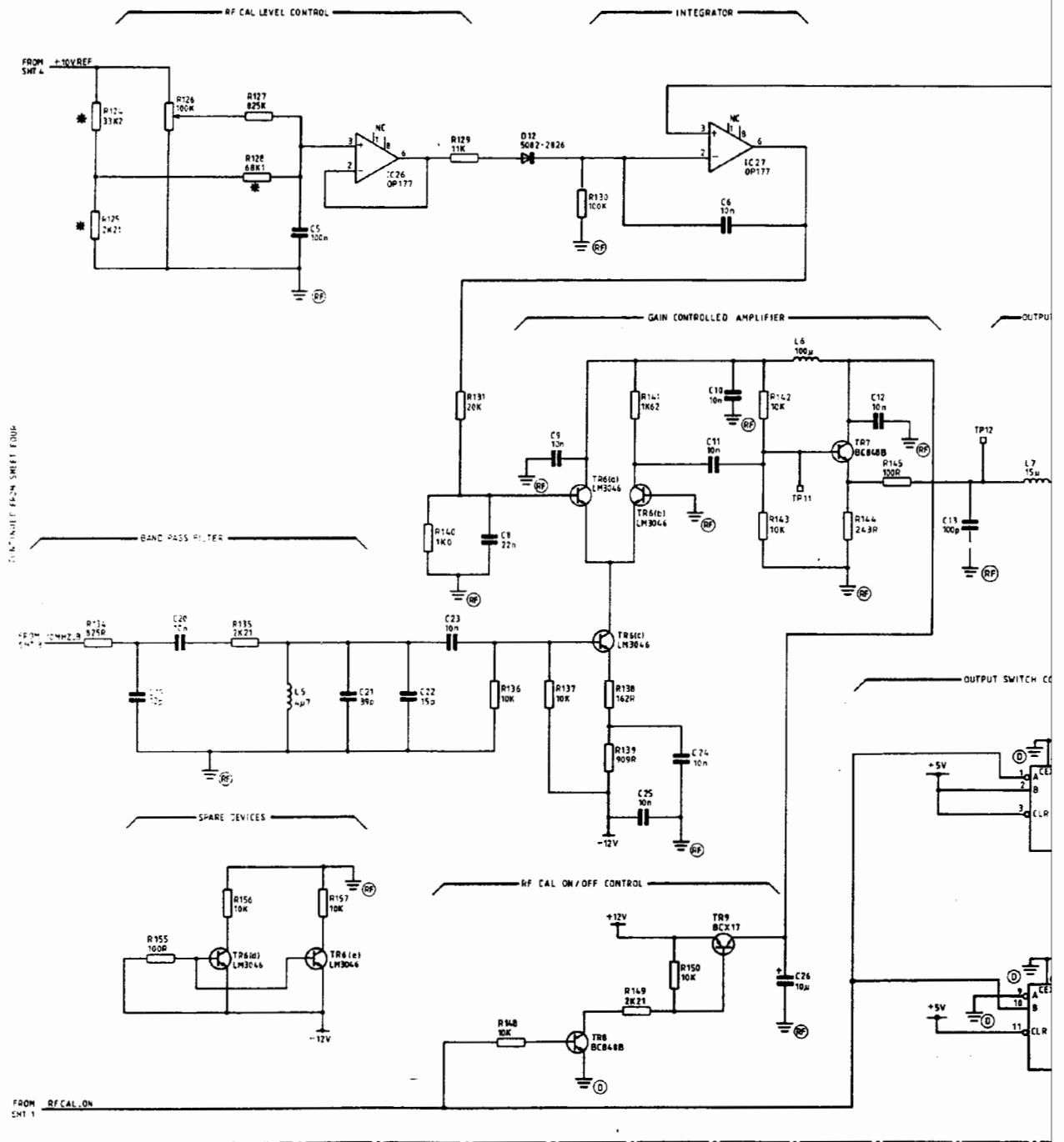
Circuit diagrams **A7**

Fig. 7-113 A7 Multimeter - circuit

\* = 0.1%  $\pm 5$ ppm



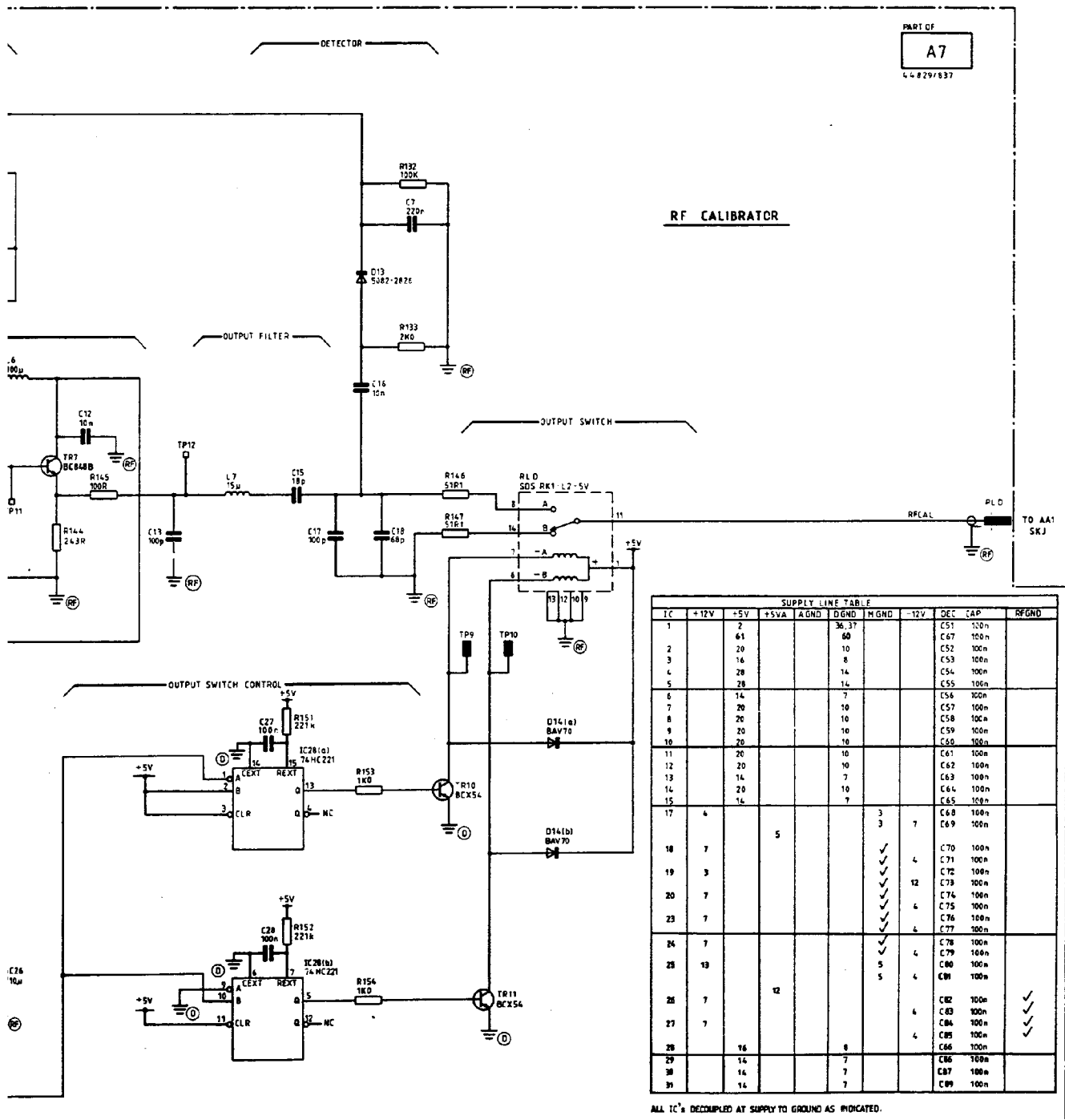
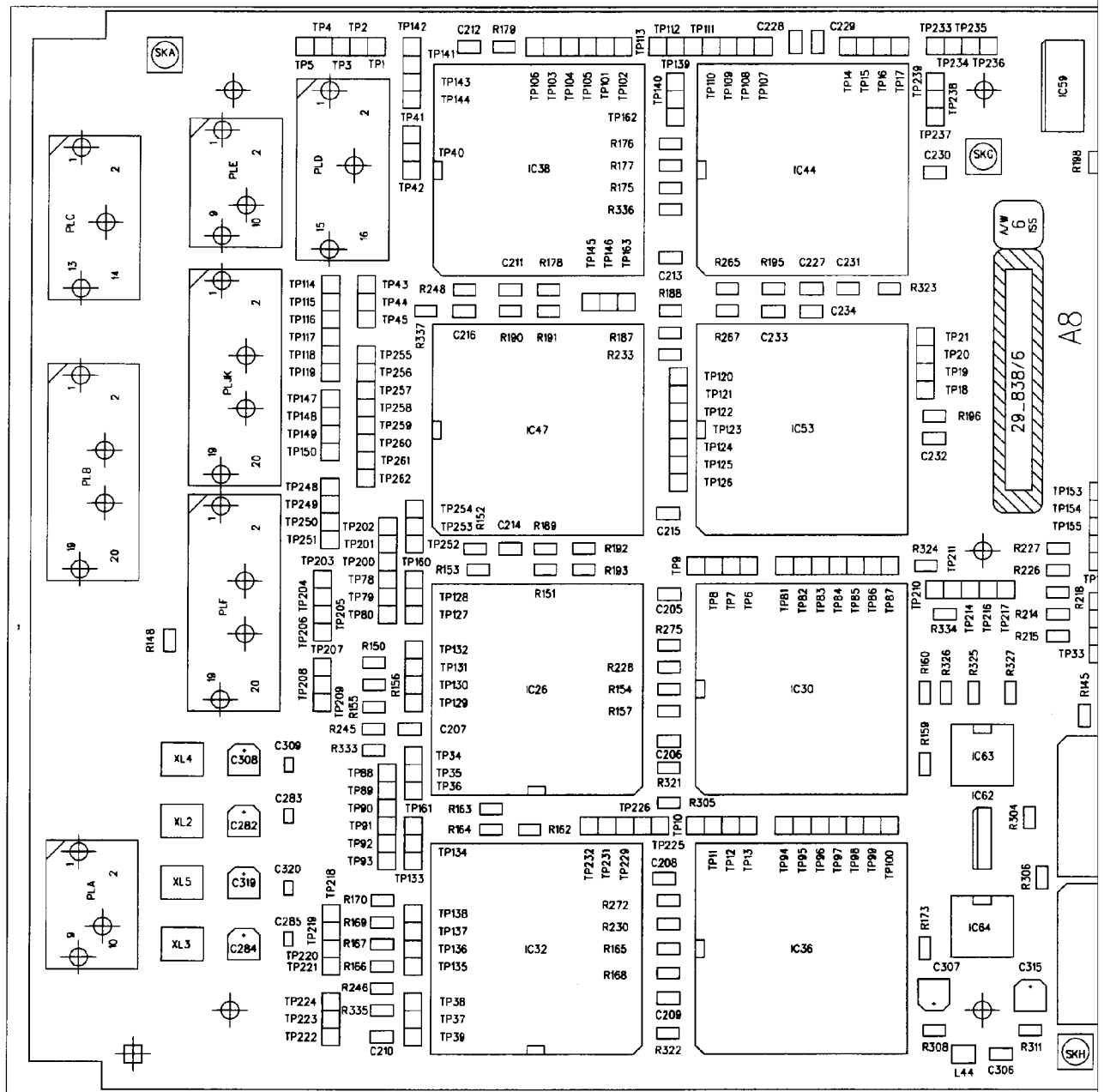
Circuit diagrams **A7**

Fig. 7-114 A7 RF calibrator - circuit

# SERVICING DIAGRAMS

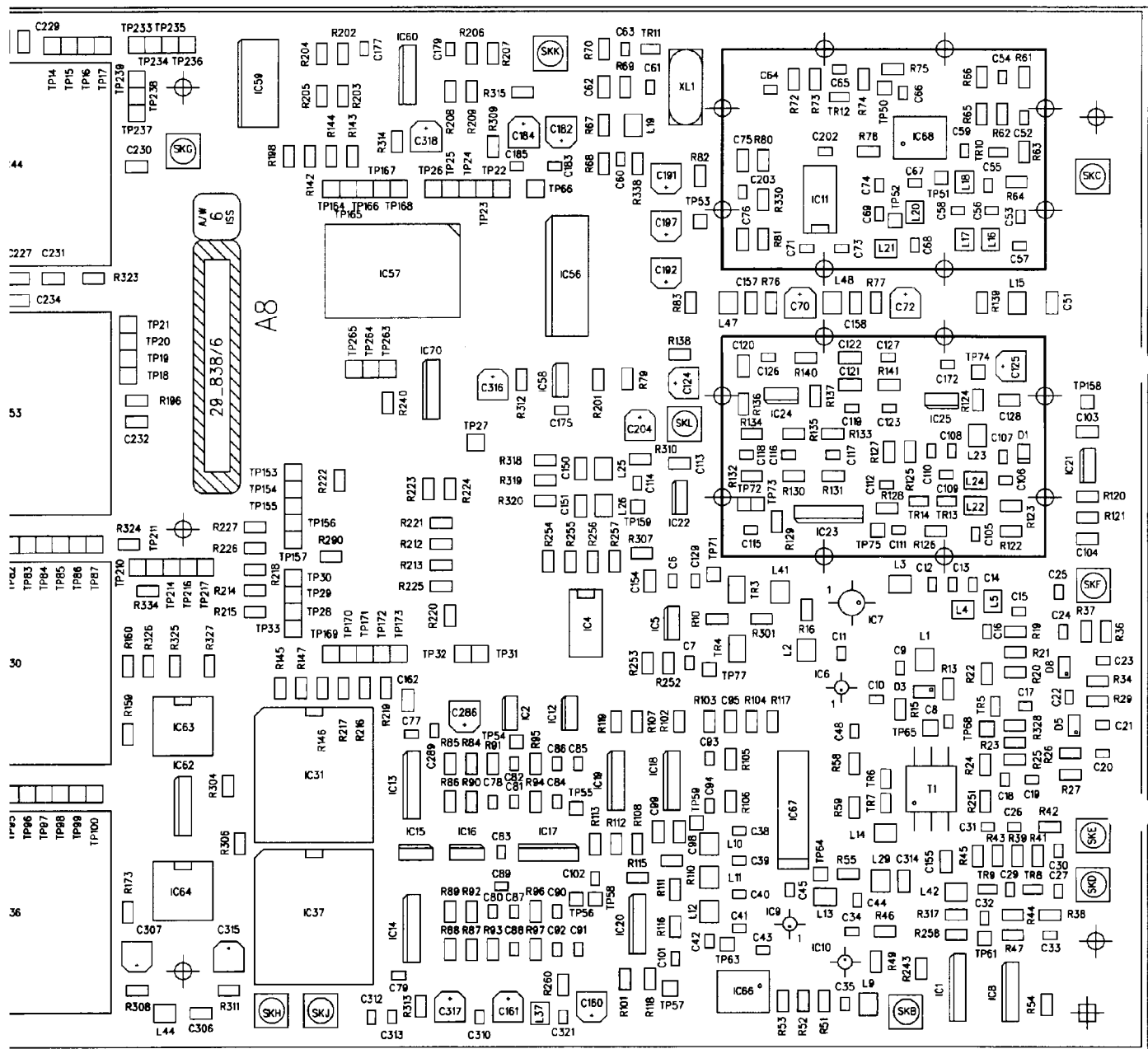


RF calibrator **A7**

Drg. No. 44829/838 Sheet 1 of 1



# Component layout A8





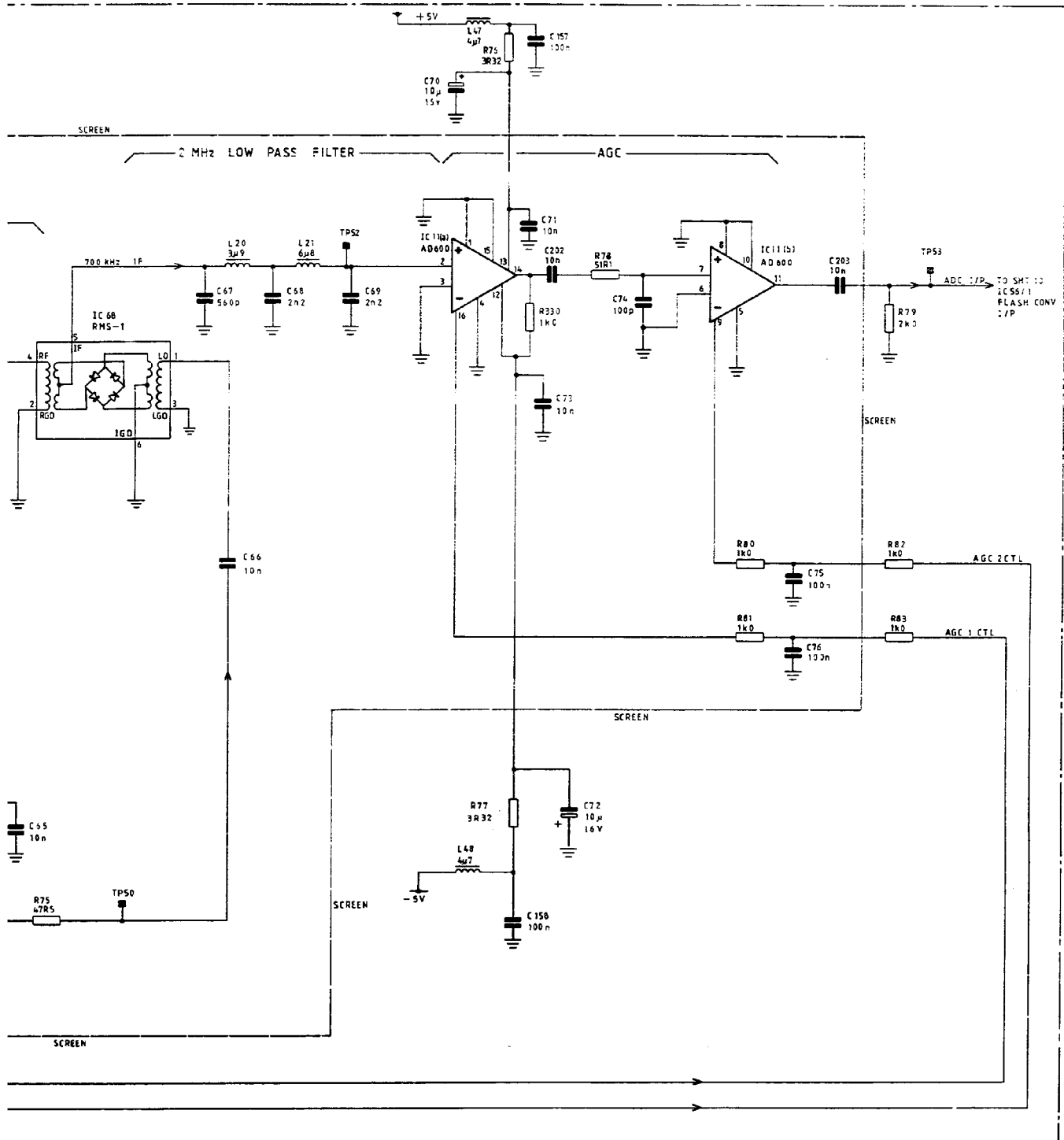
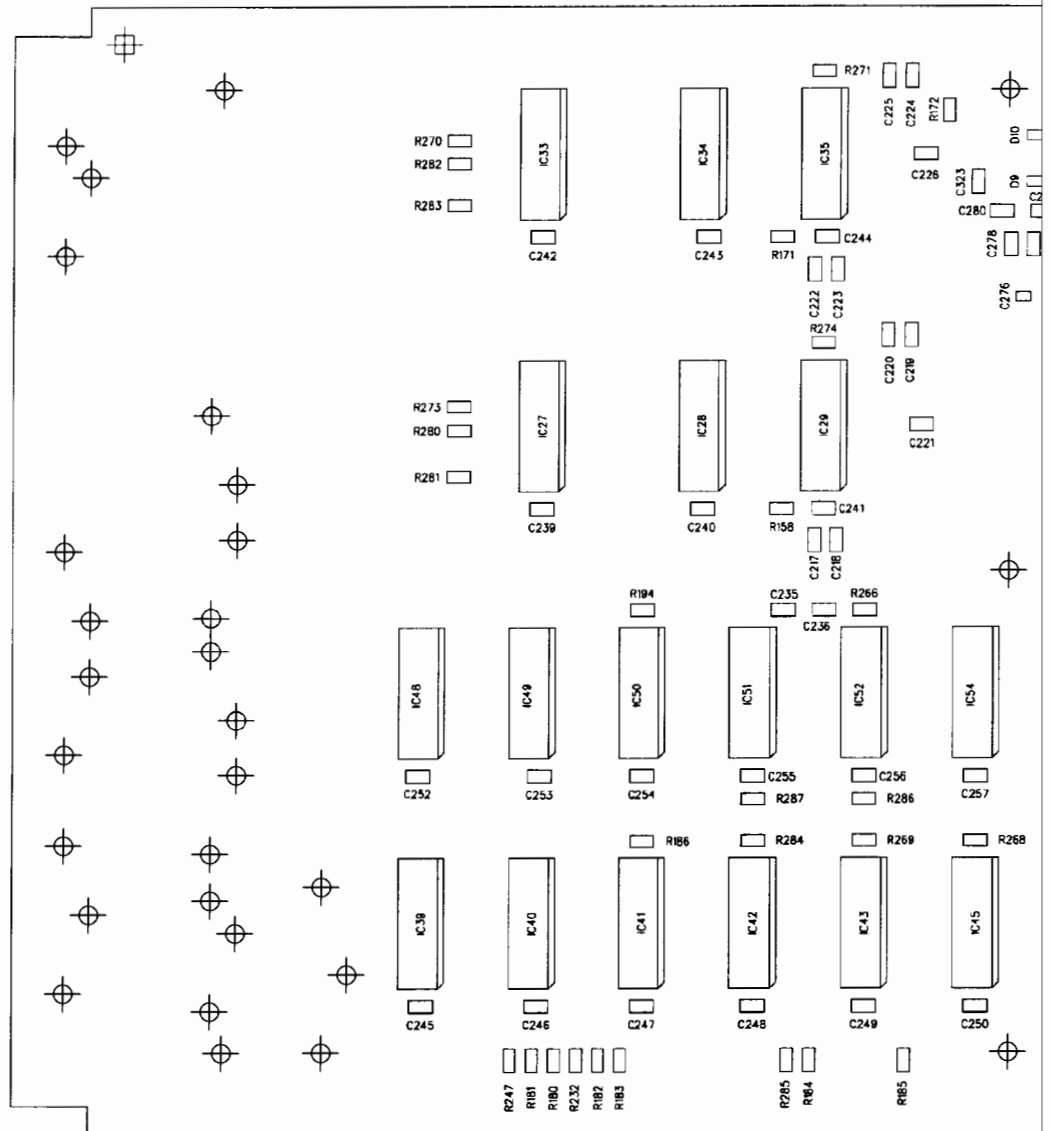
Circuit diagrams **A8**

Fig. 7-116 A8 2 MHz, 15 MHz low-pass and 10 MHz band-pass filters, AGC - circuit

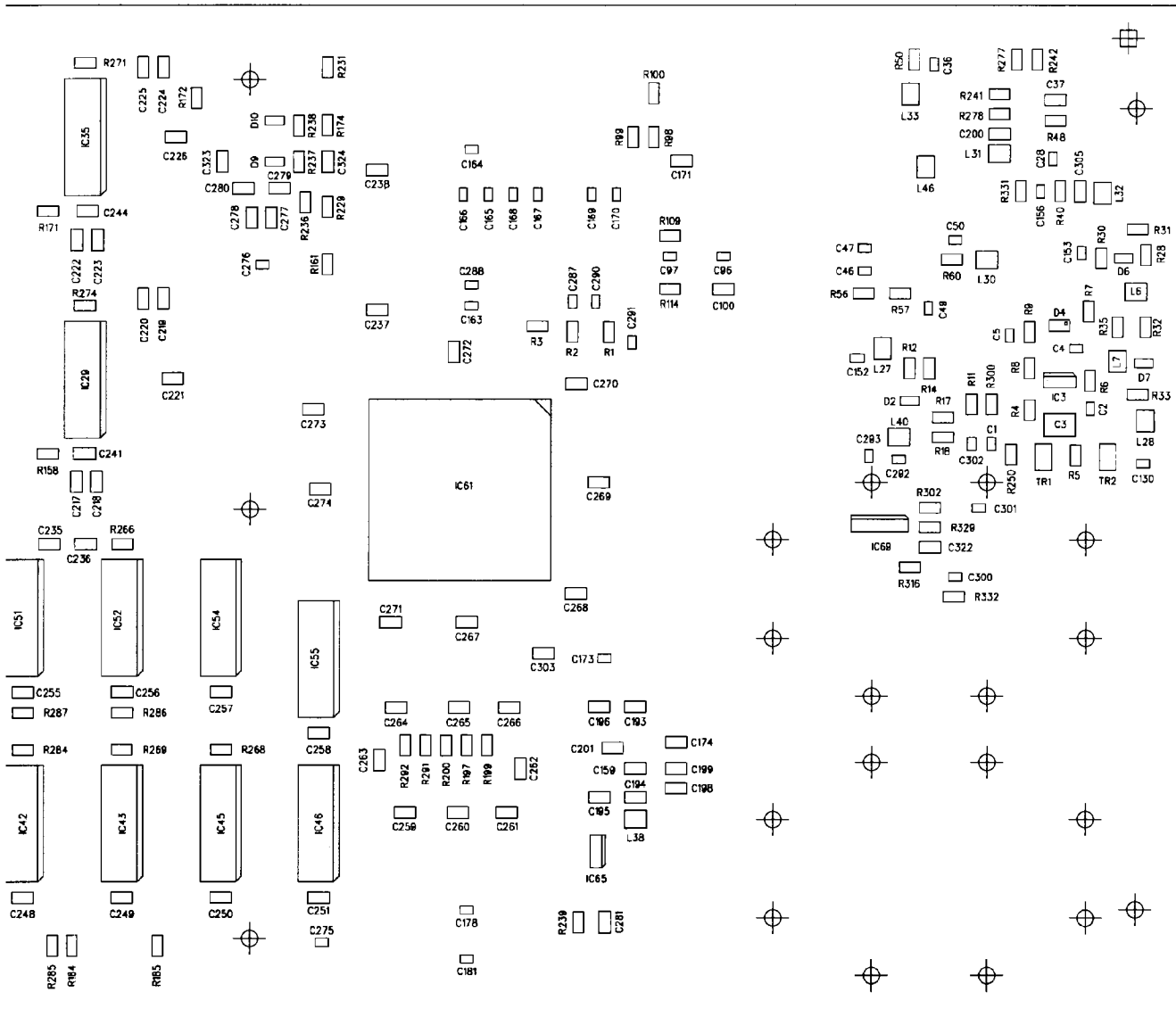
# SERVICING DIAGRAMS



SOLD

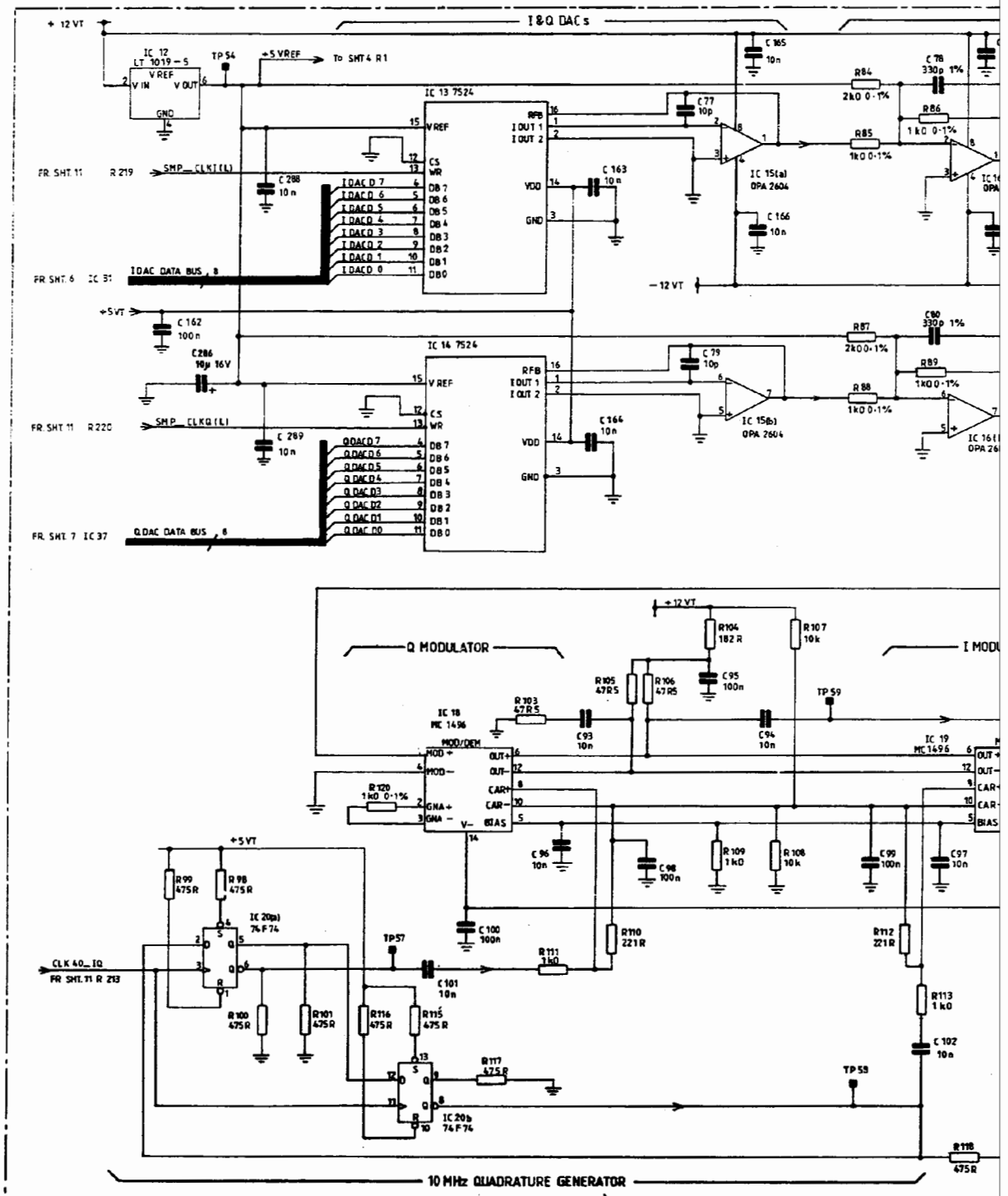
2 MHz, 15 MHz low-pass and 10 MHz band-pass filters, AGC **A8**

## Component layout A8



SOLDER SIDE

Fig. 7-117 A8 Complex modem and IF - component layout, solder side



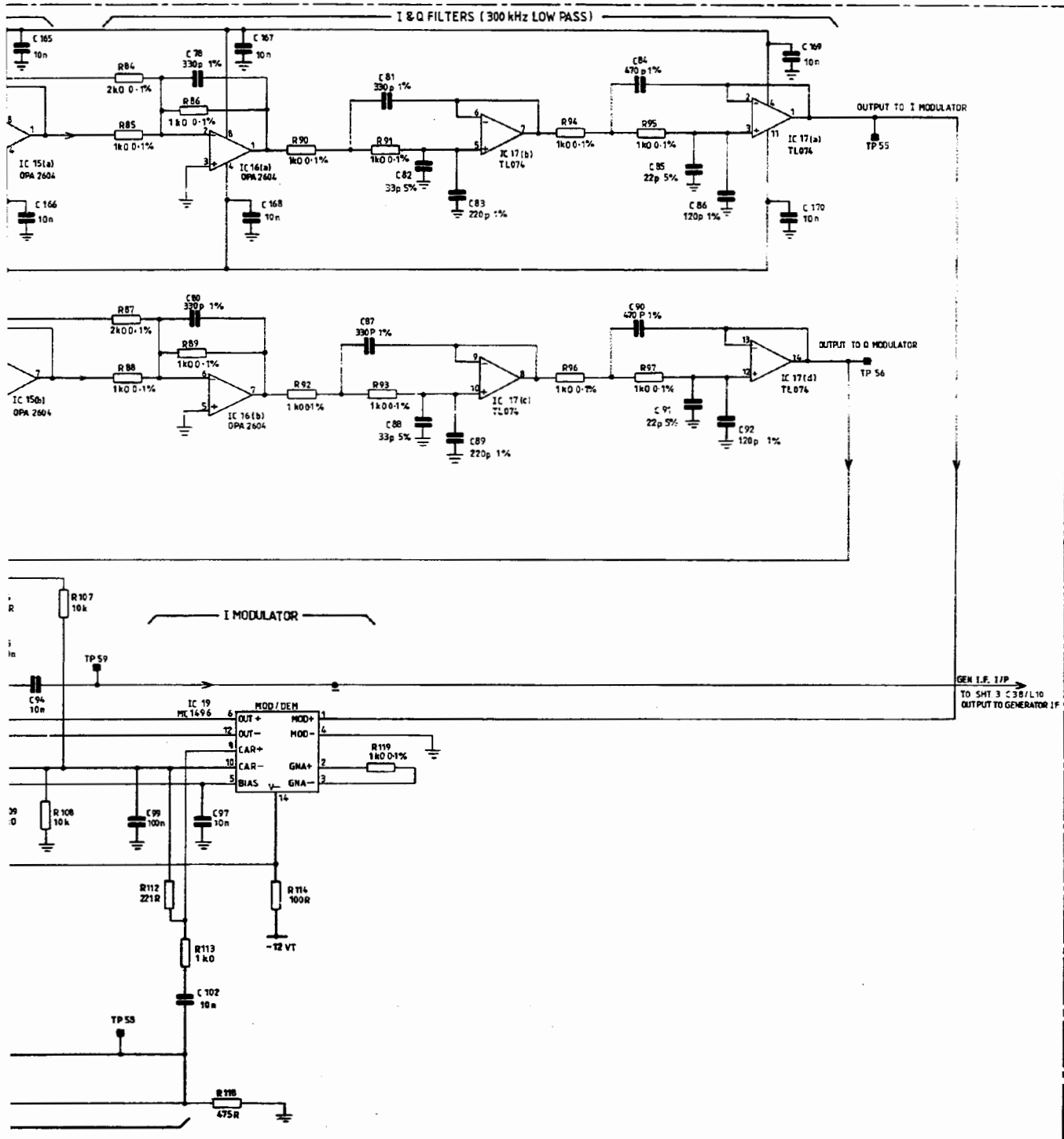
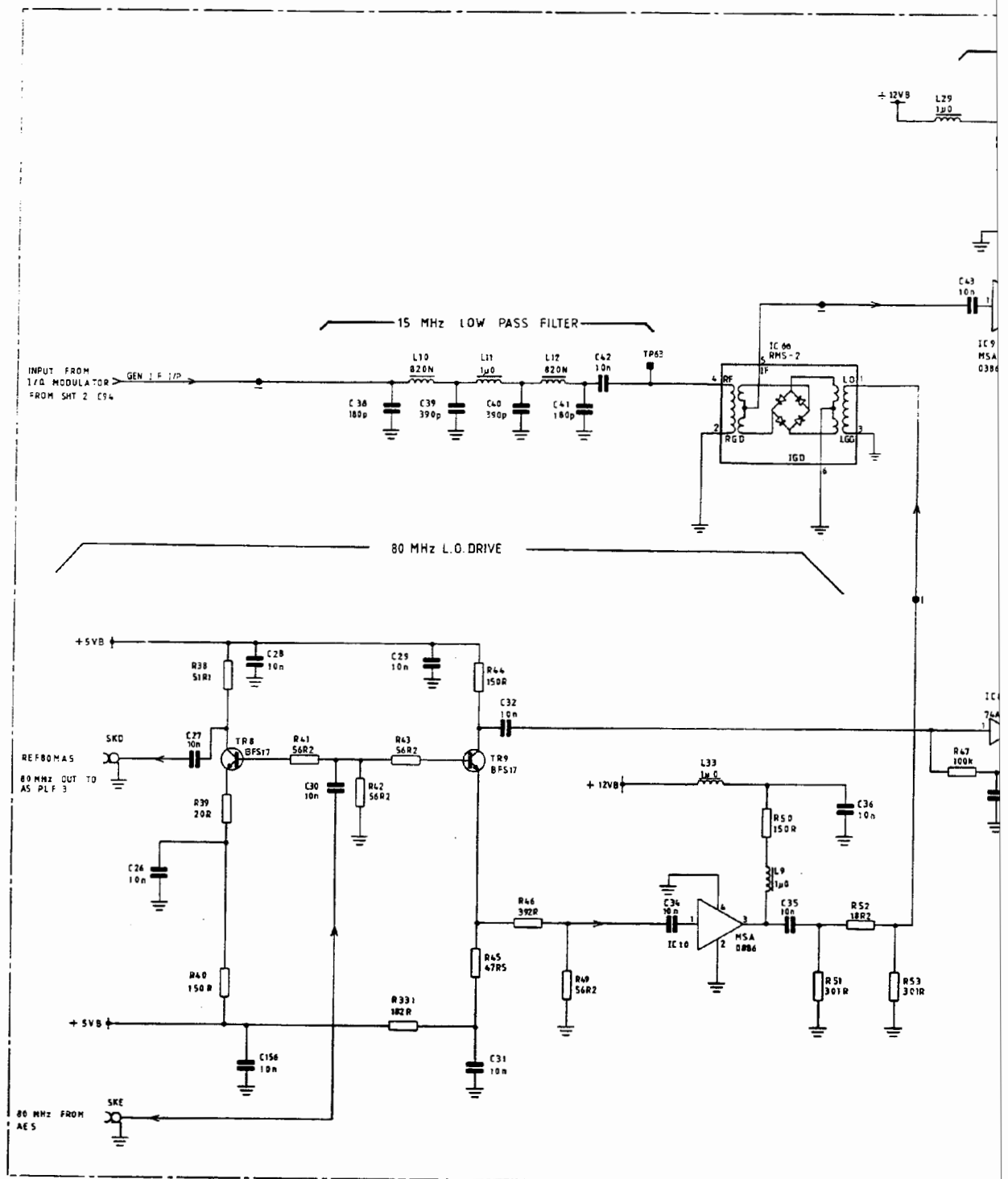
Circuit diagrams **A8**

Fig. 7-118 A8 I and Q DACs, filters and modulators, quadrature generator - circuit





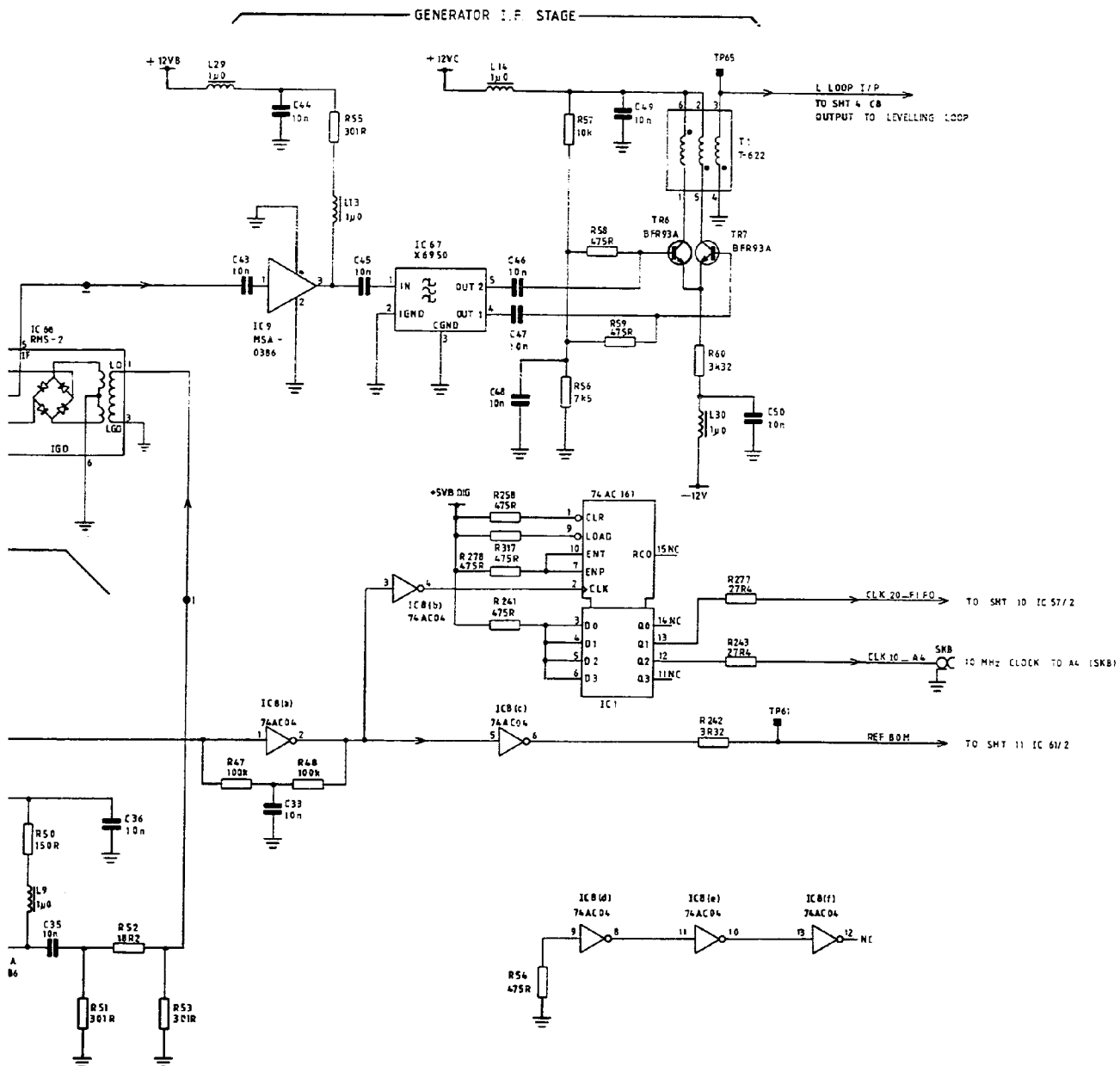
Circuit diagrams **A8**

Fig. 7-119 A8 15 MHz low-pass filter, generator IF, 80 MHz LO drive - circuit



Circuit diagrams **A8**

REF

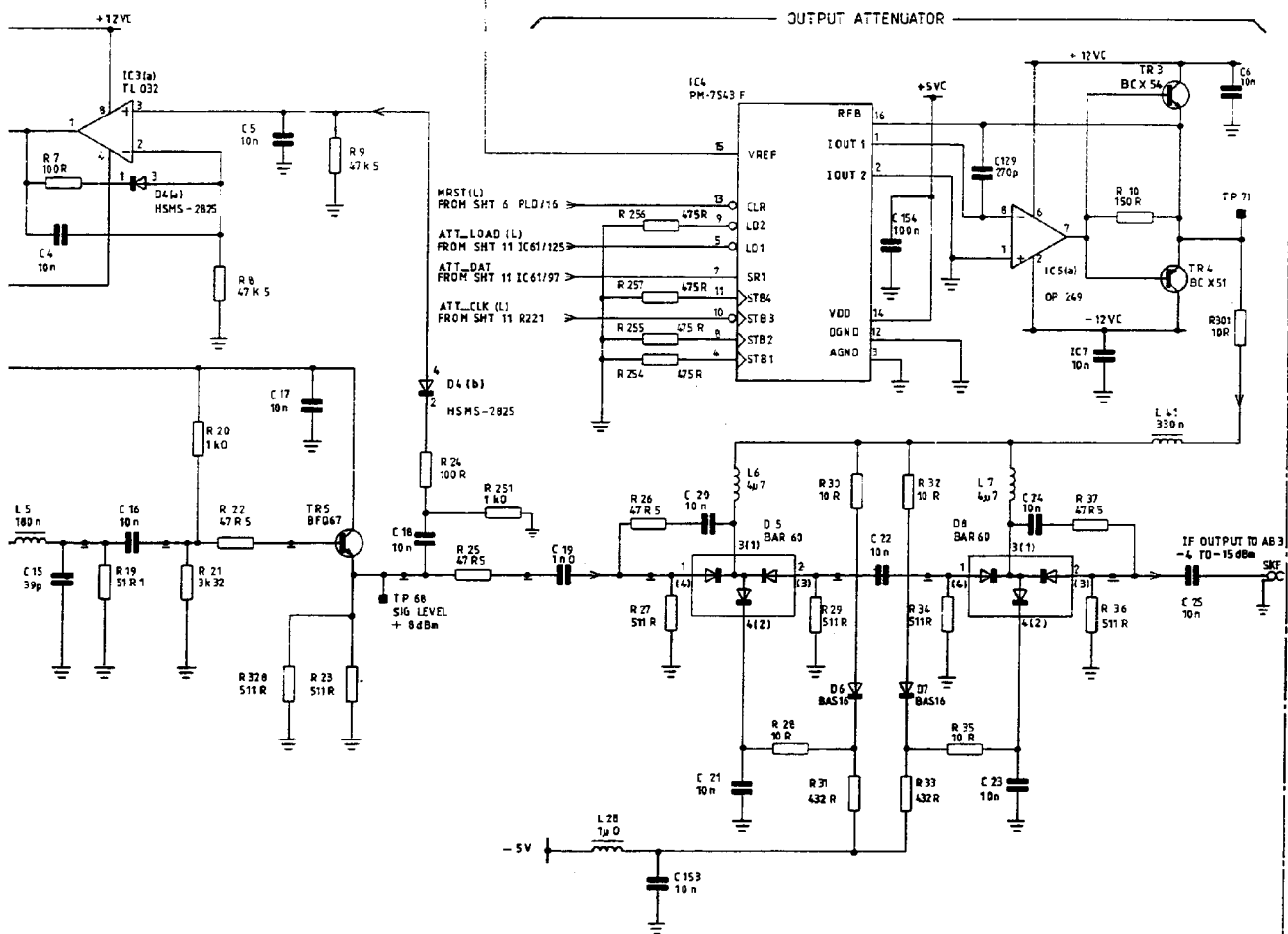
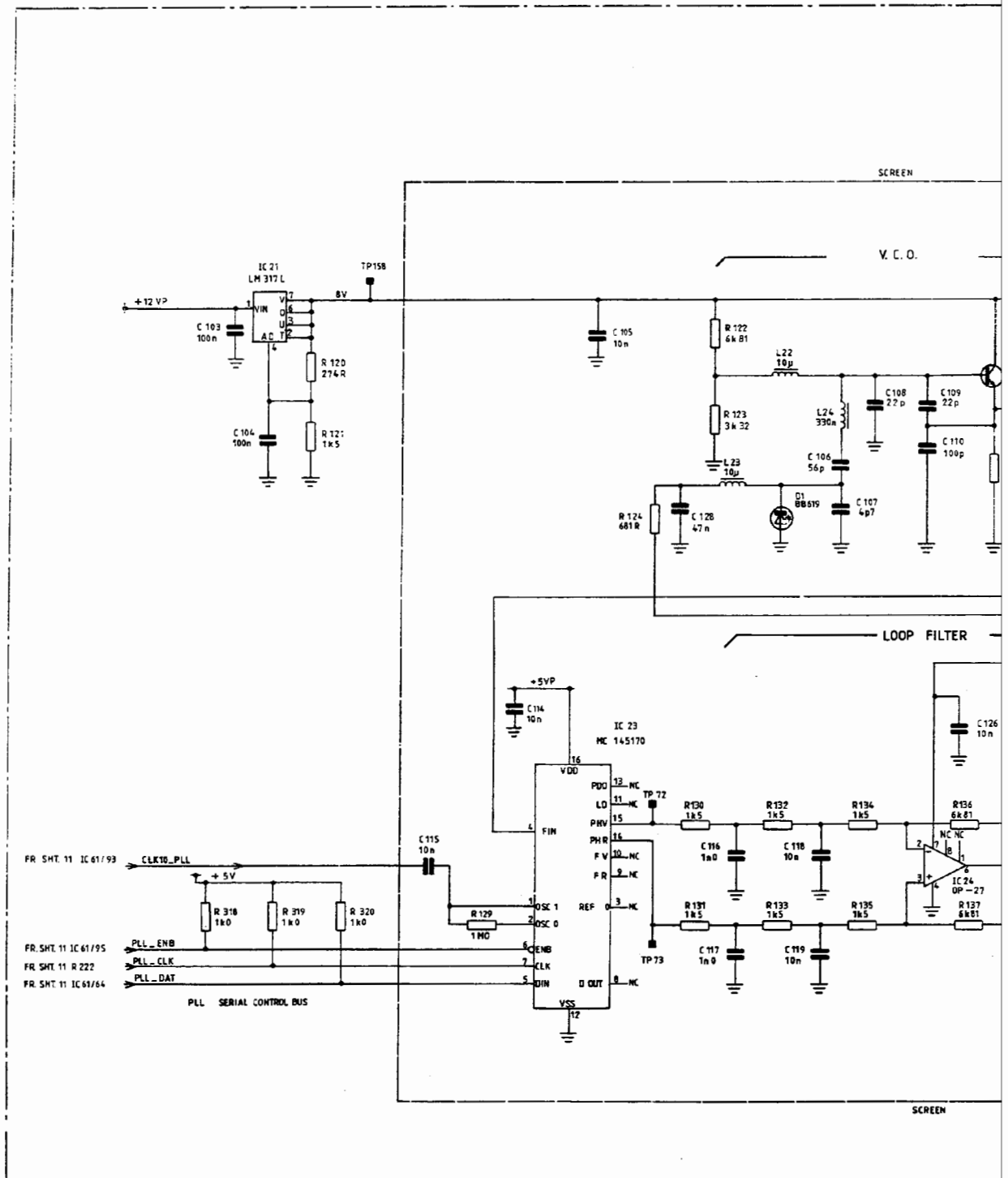


Fig. 7-120 A8 Voltage reference, levelling loop, and output attenuator - circuit



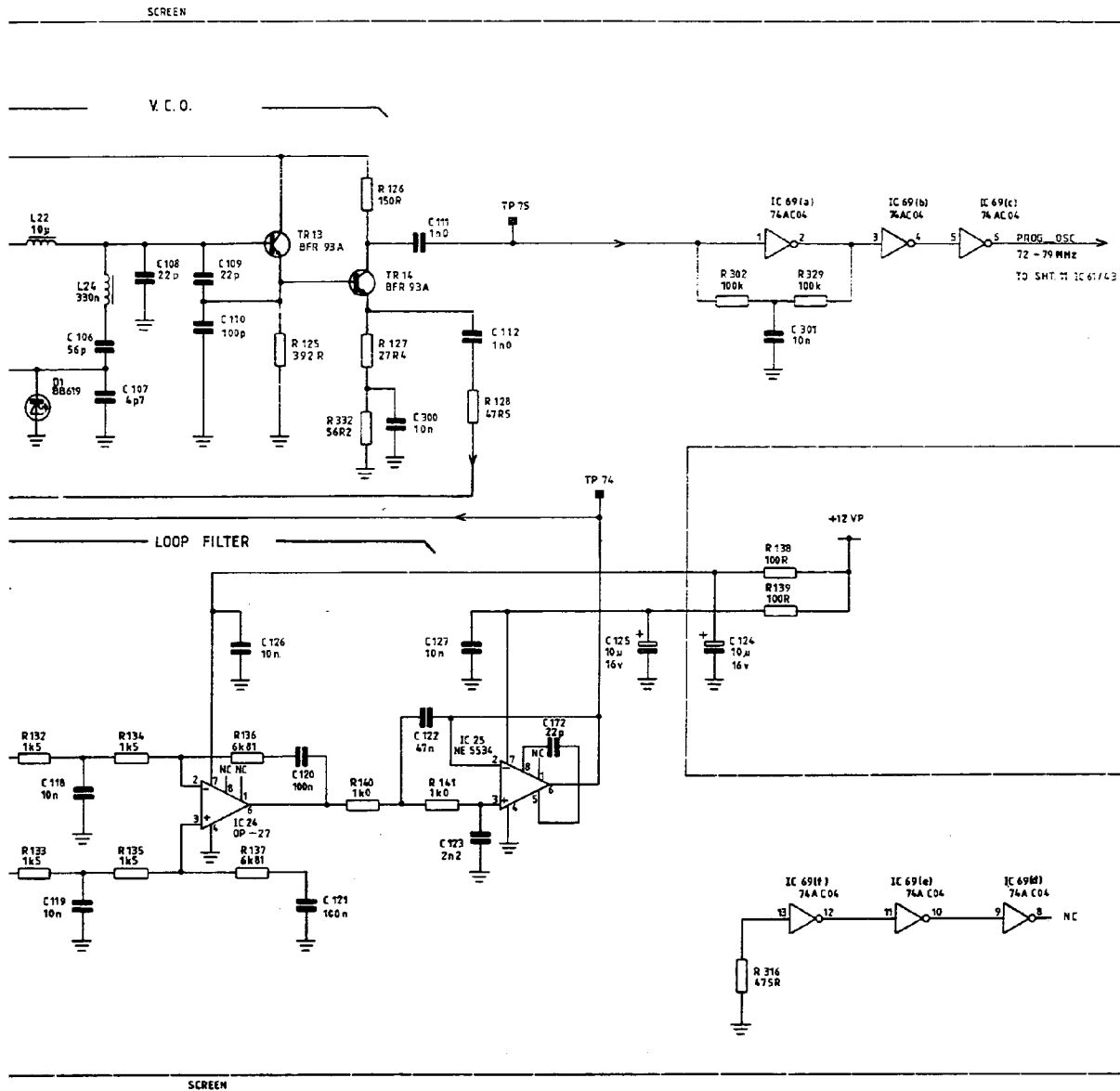
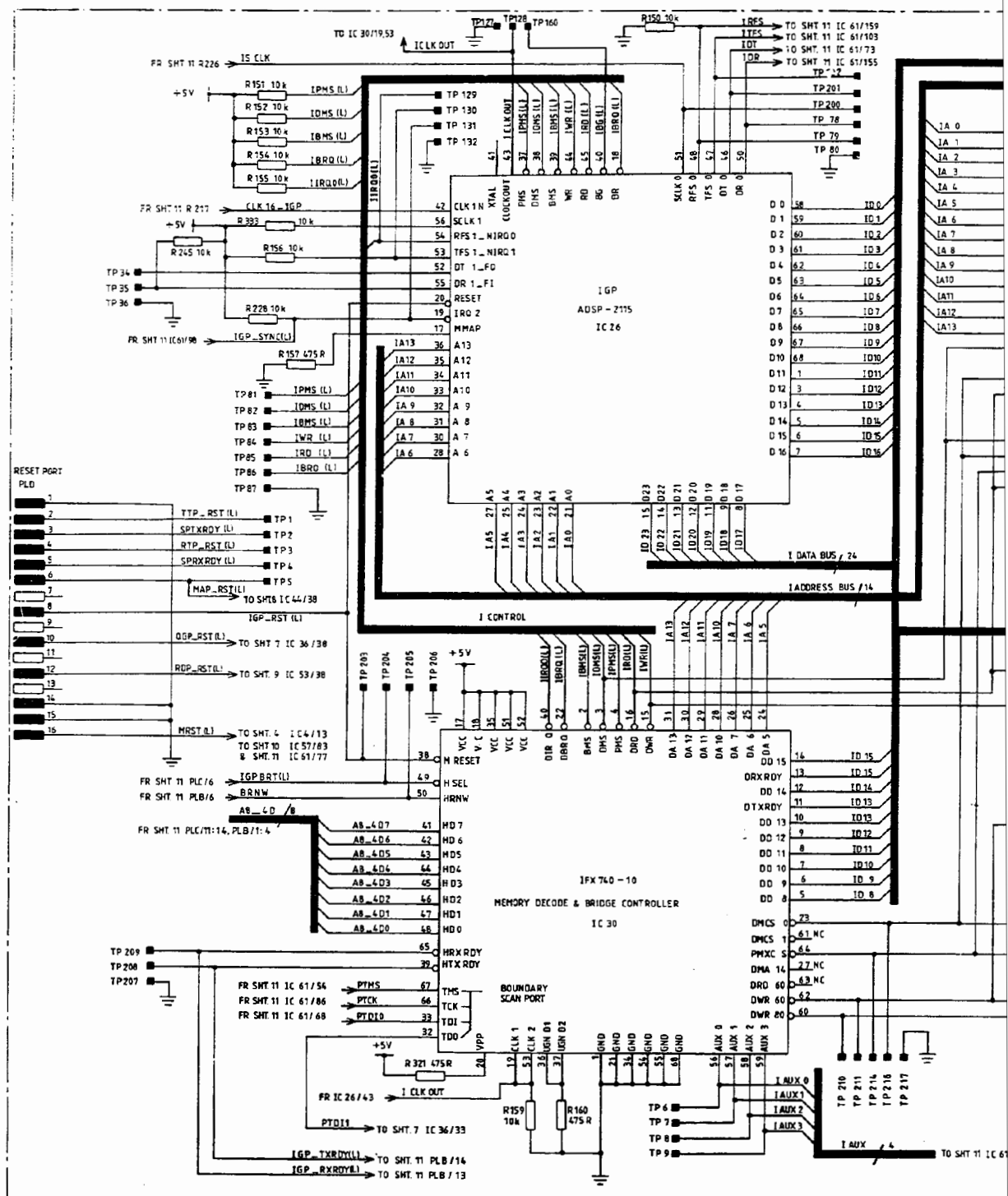
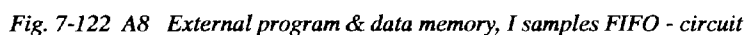
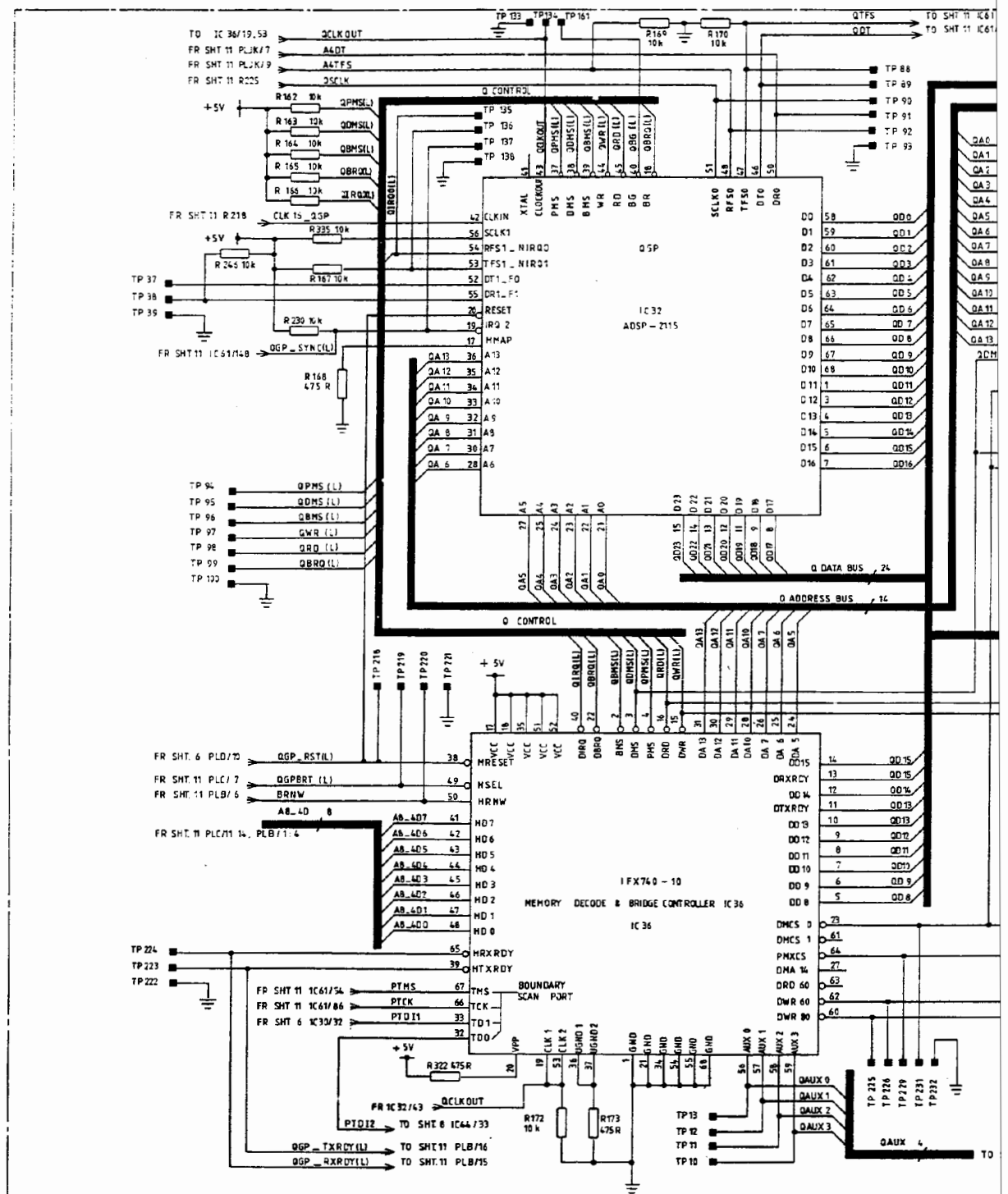
Circuit diagrams **A8**

Fig. 7-121 A8 VCO and loop filter - circuit









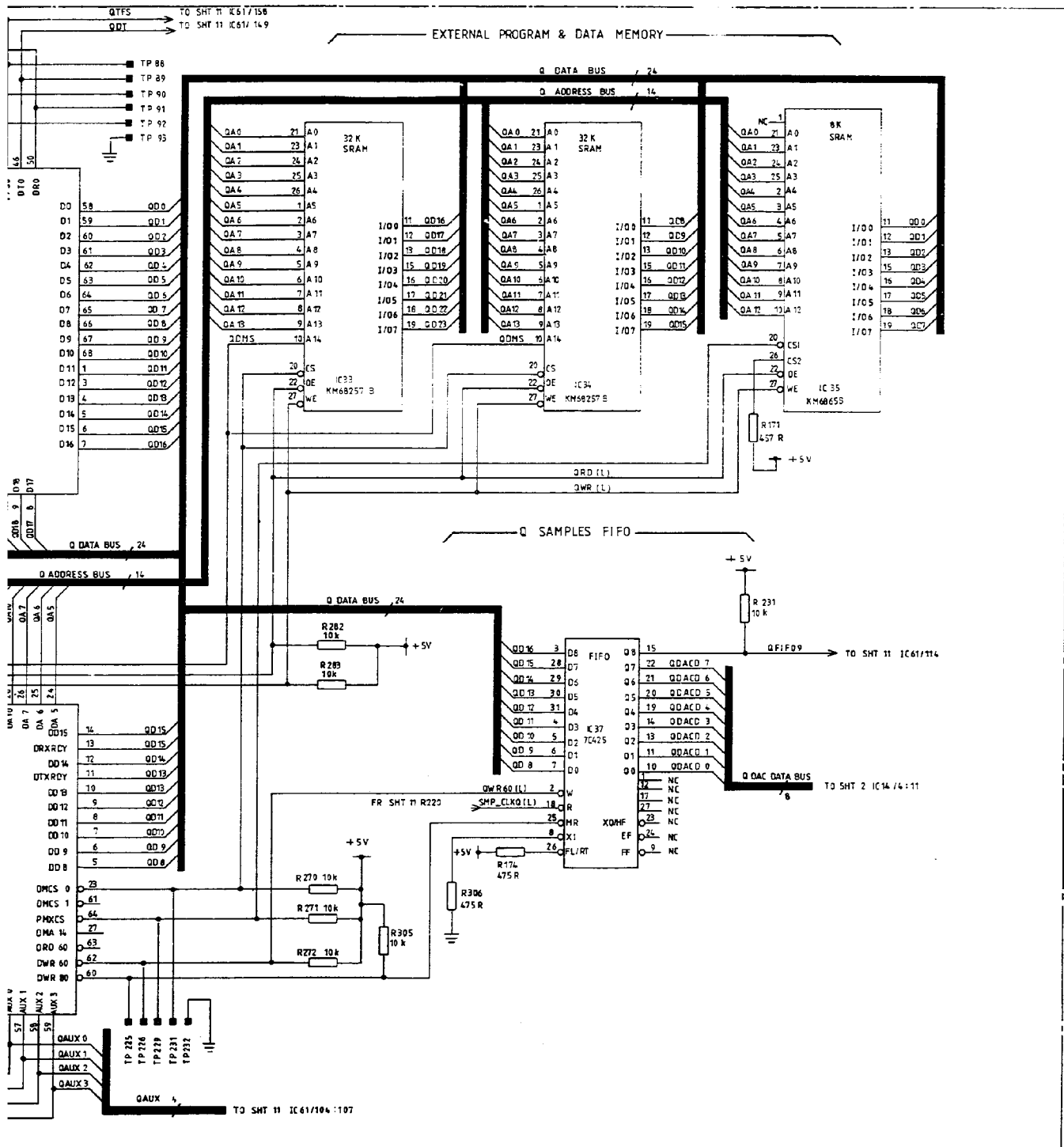
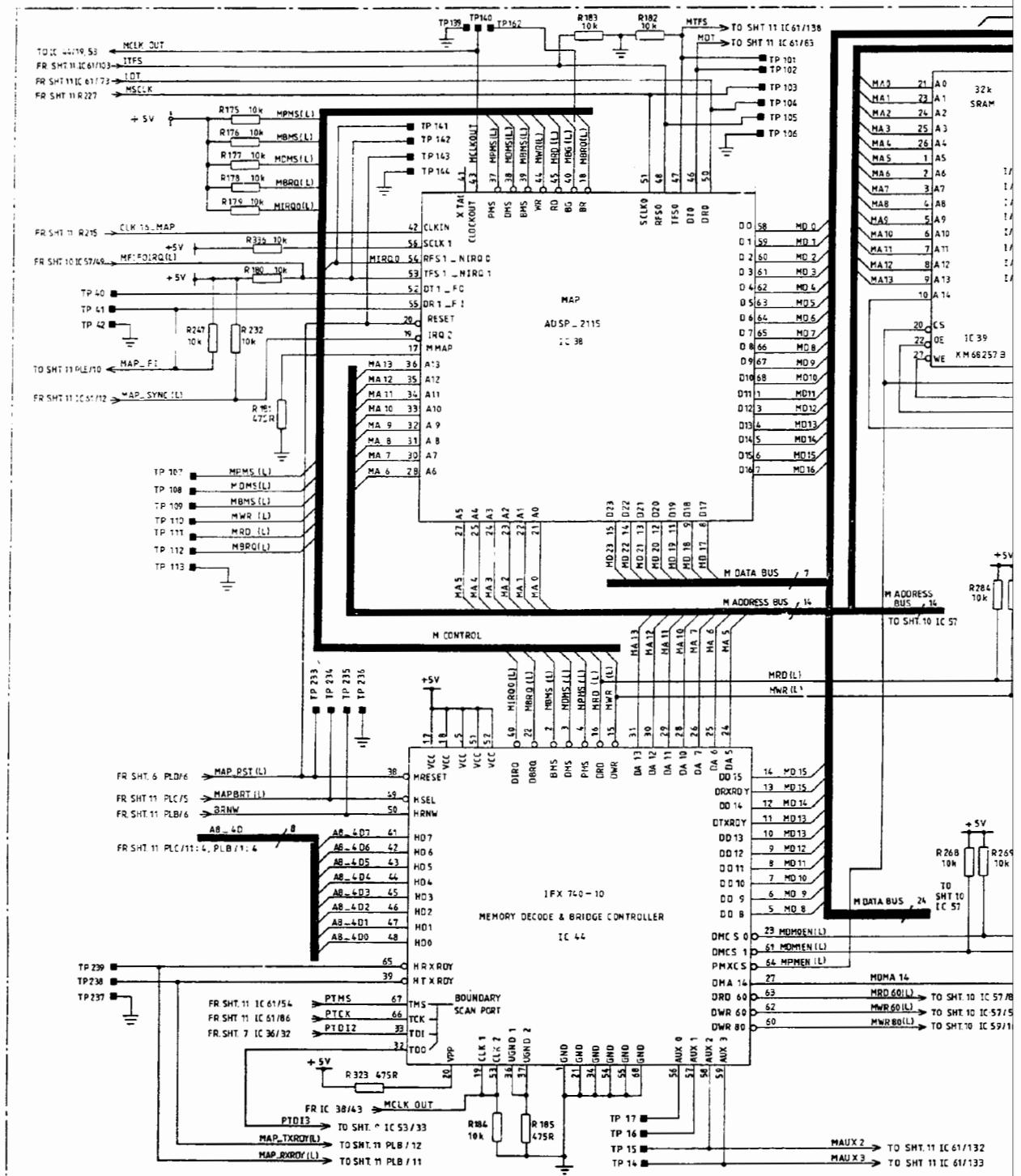
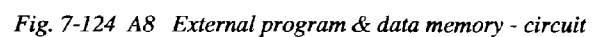
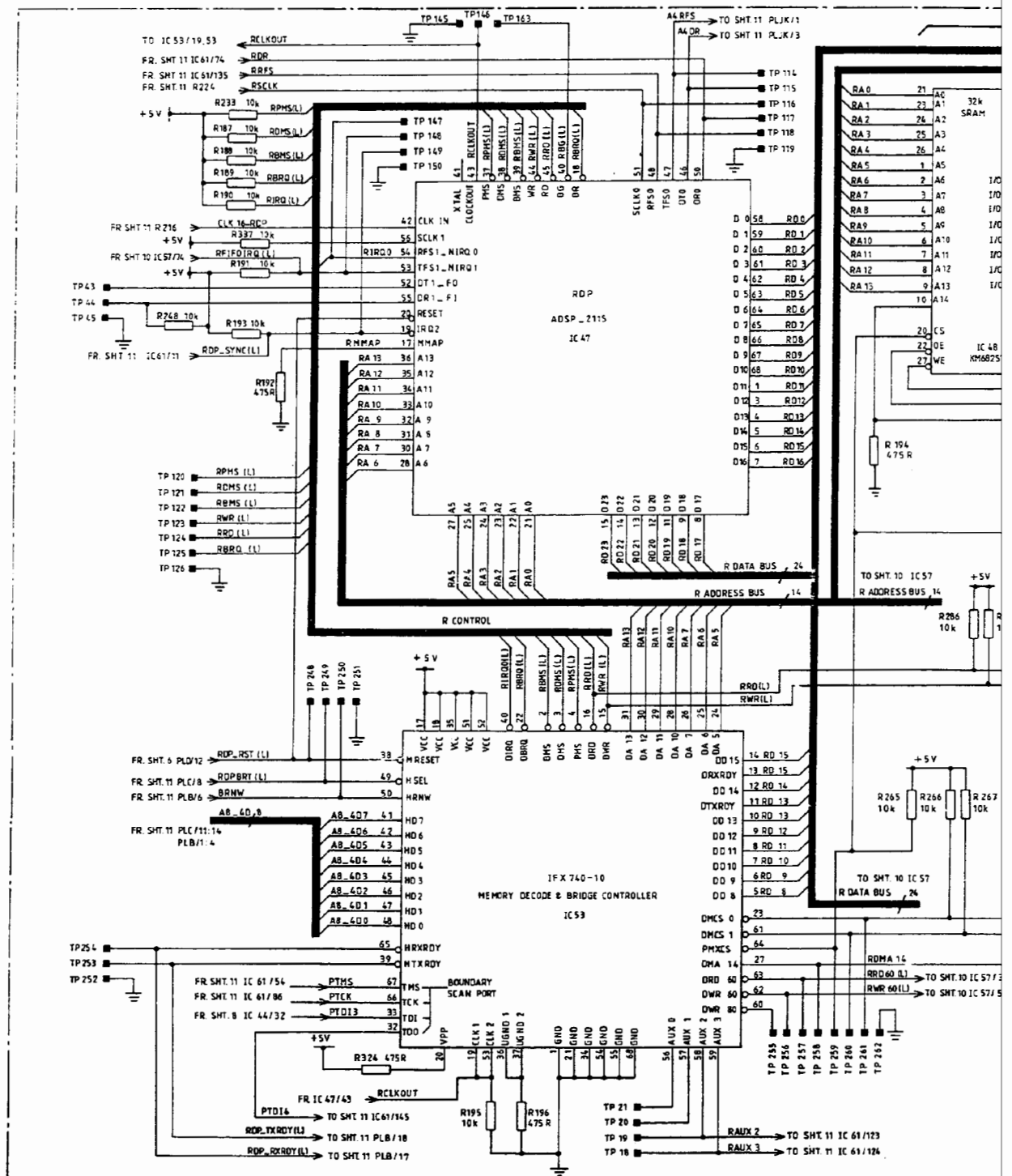
Circuit diagrams **A8**

Fig. 7-123 A8 External program &amp; data memory, Q samples FIFO - circuit







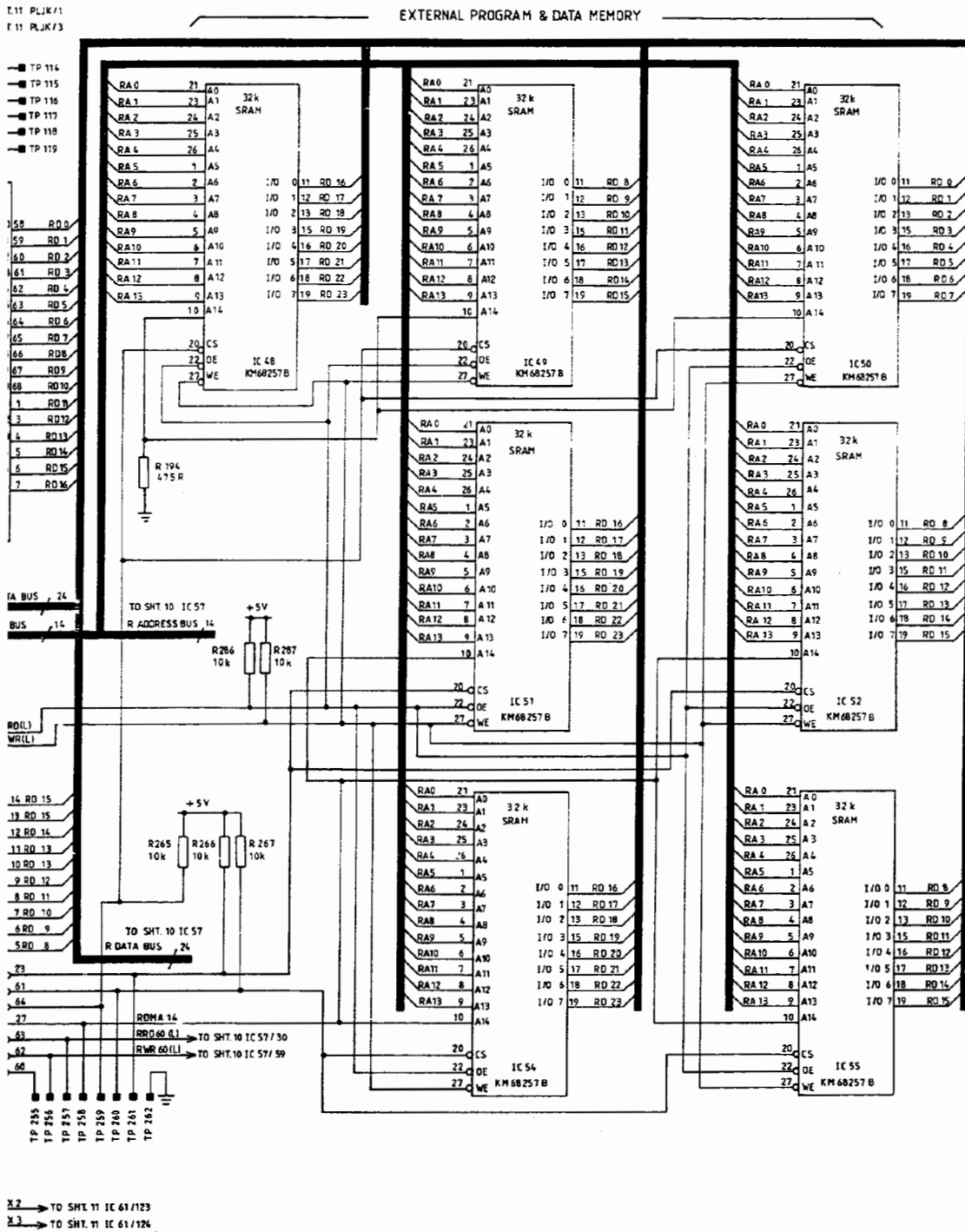
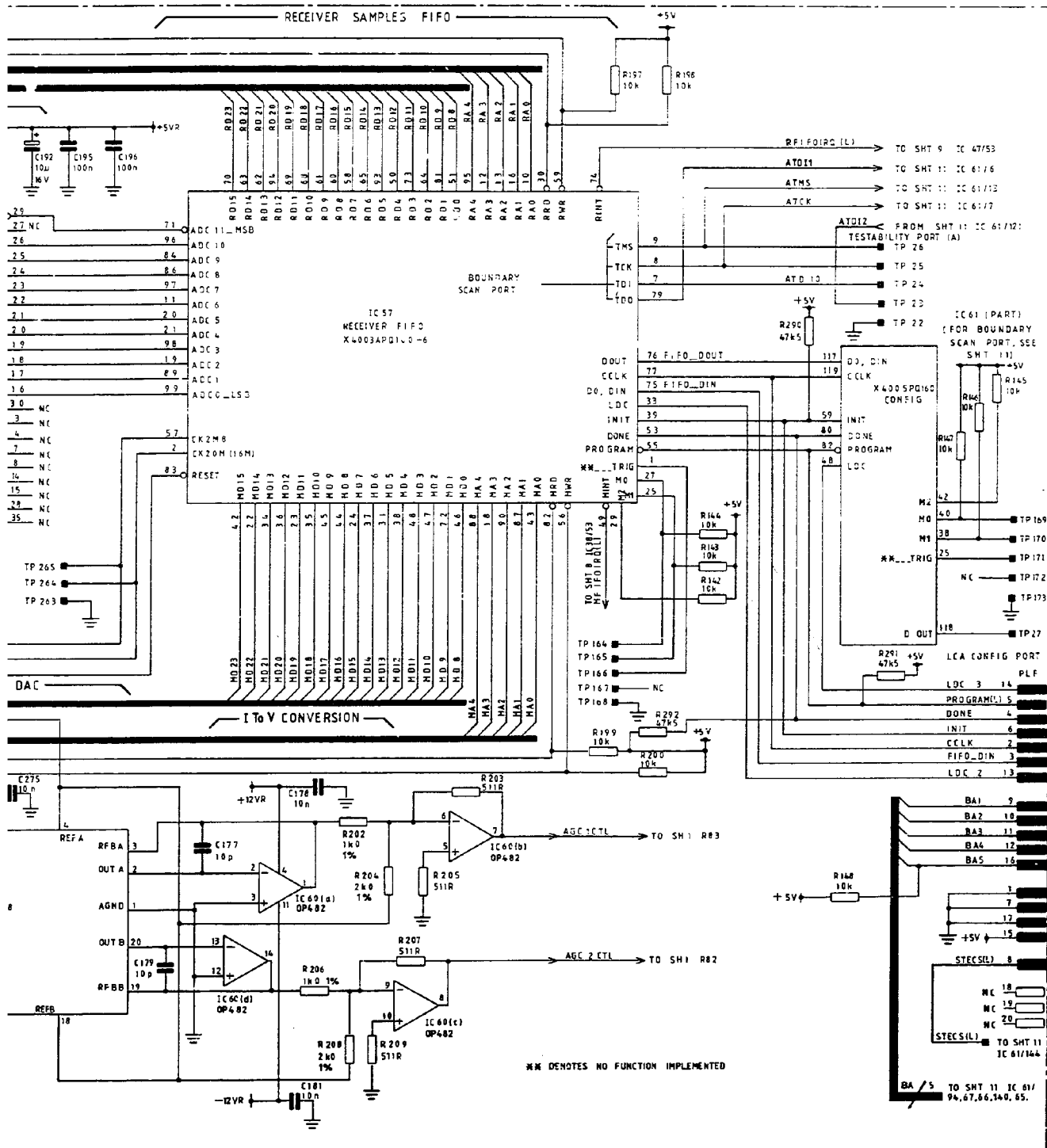
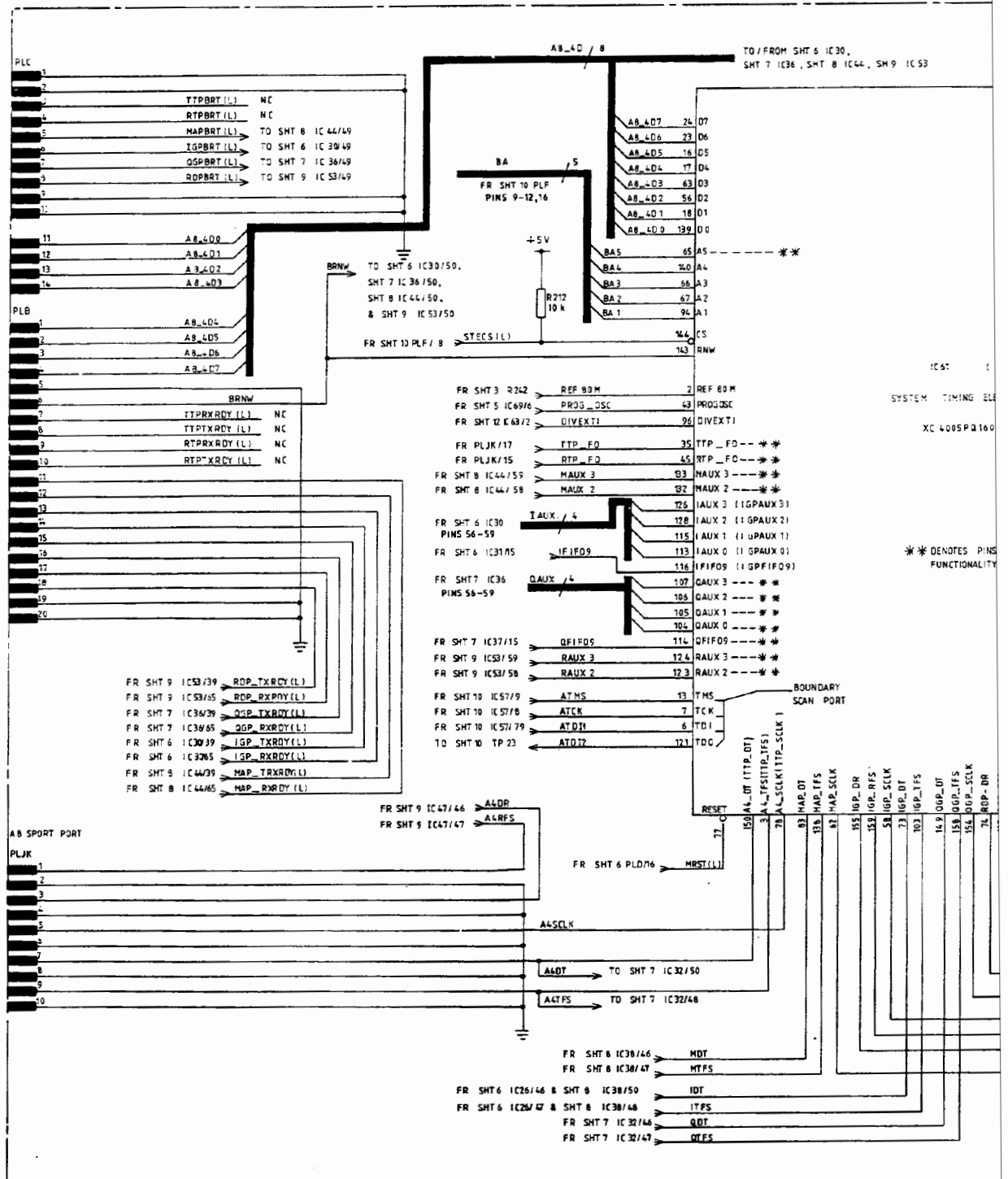
Circuit diagrams **A8**

Fig. 7-125 A8 External program &amp; data memory - circuit



Circuit diagrams **A8**





## Circuit diagrams A8

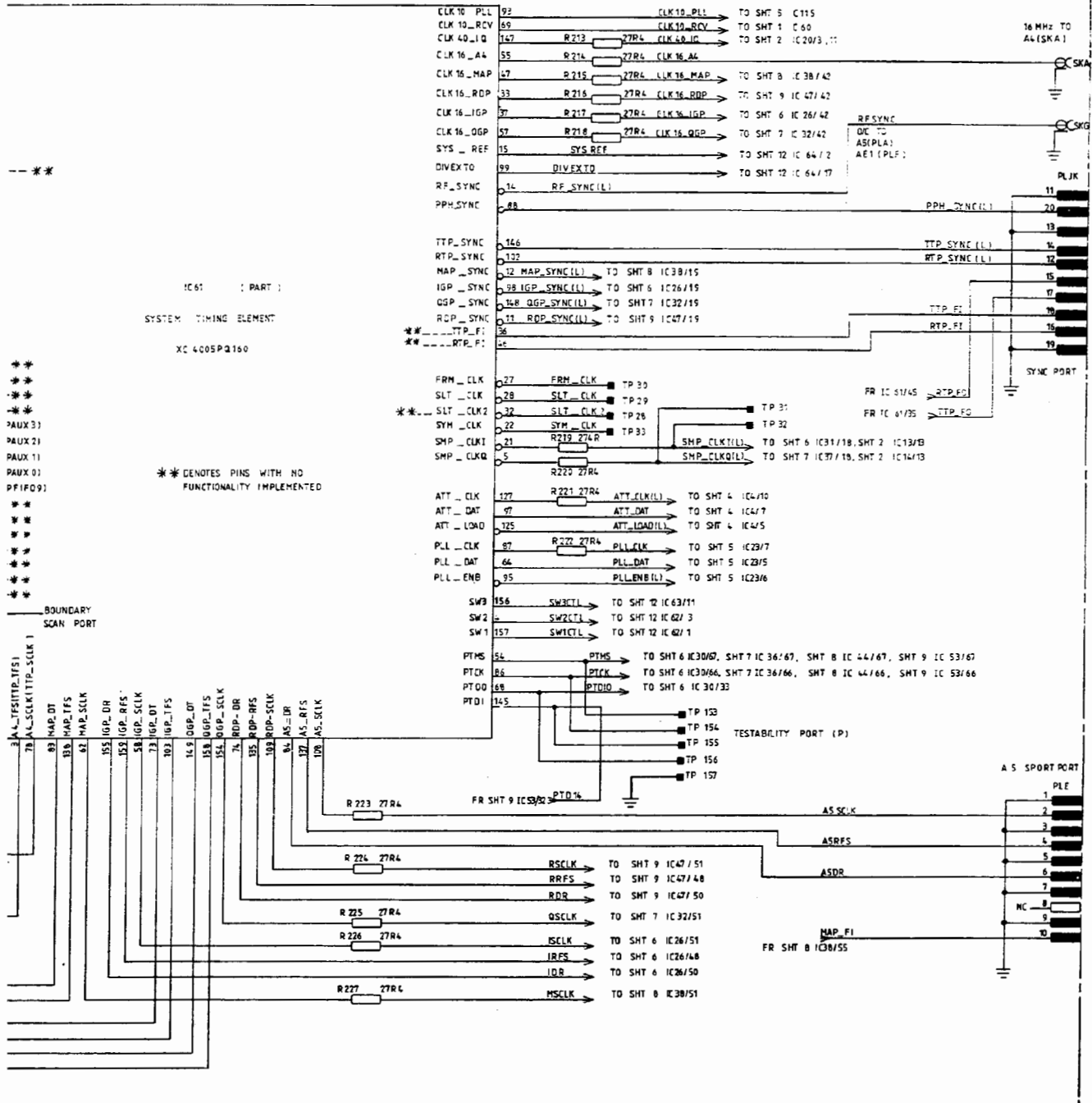
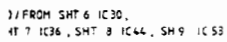
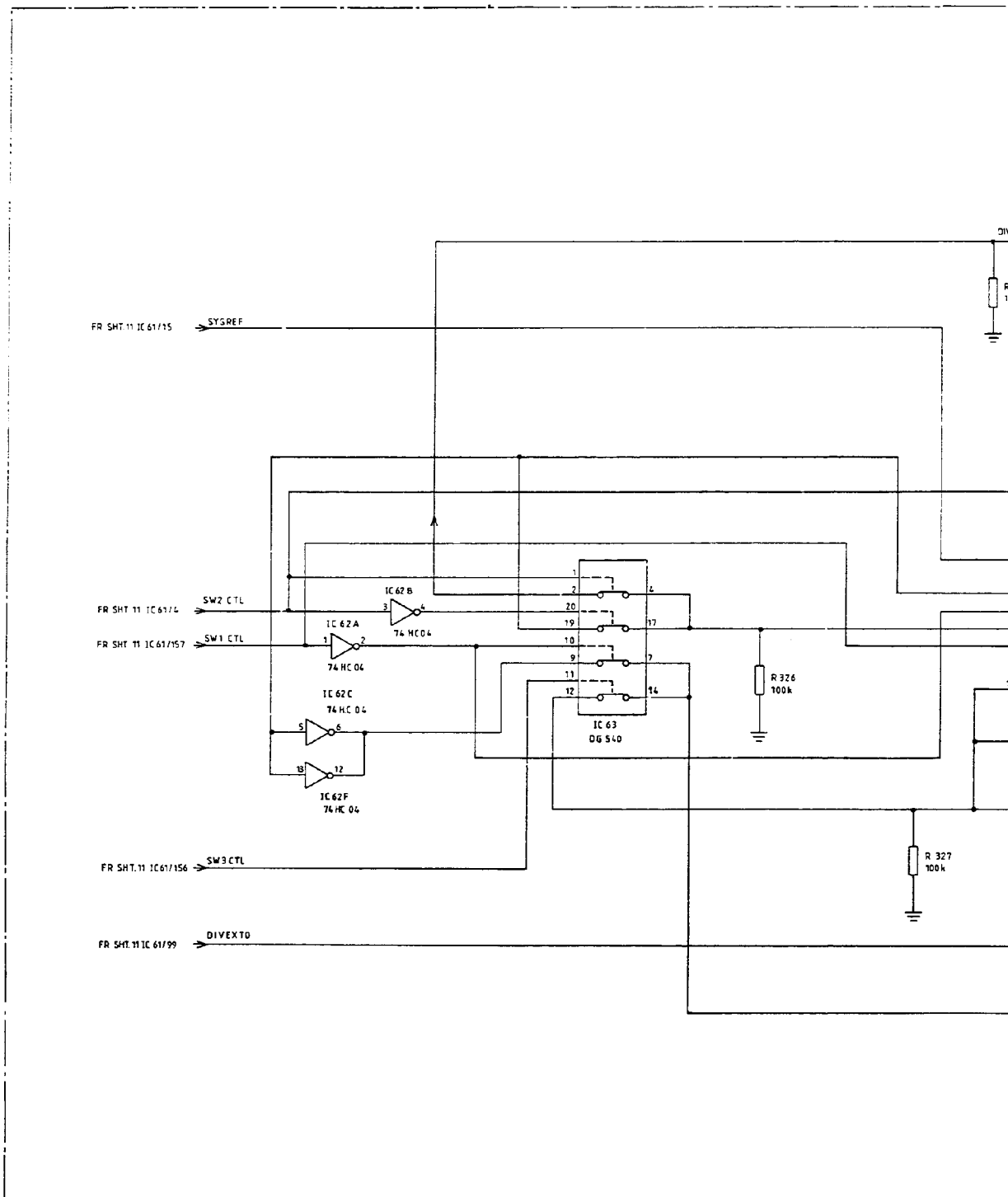


Fig. 7-127 A8 System timing element - circuit



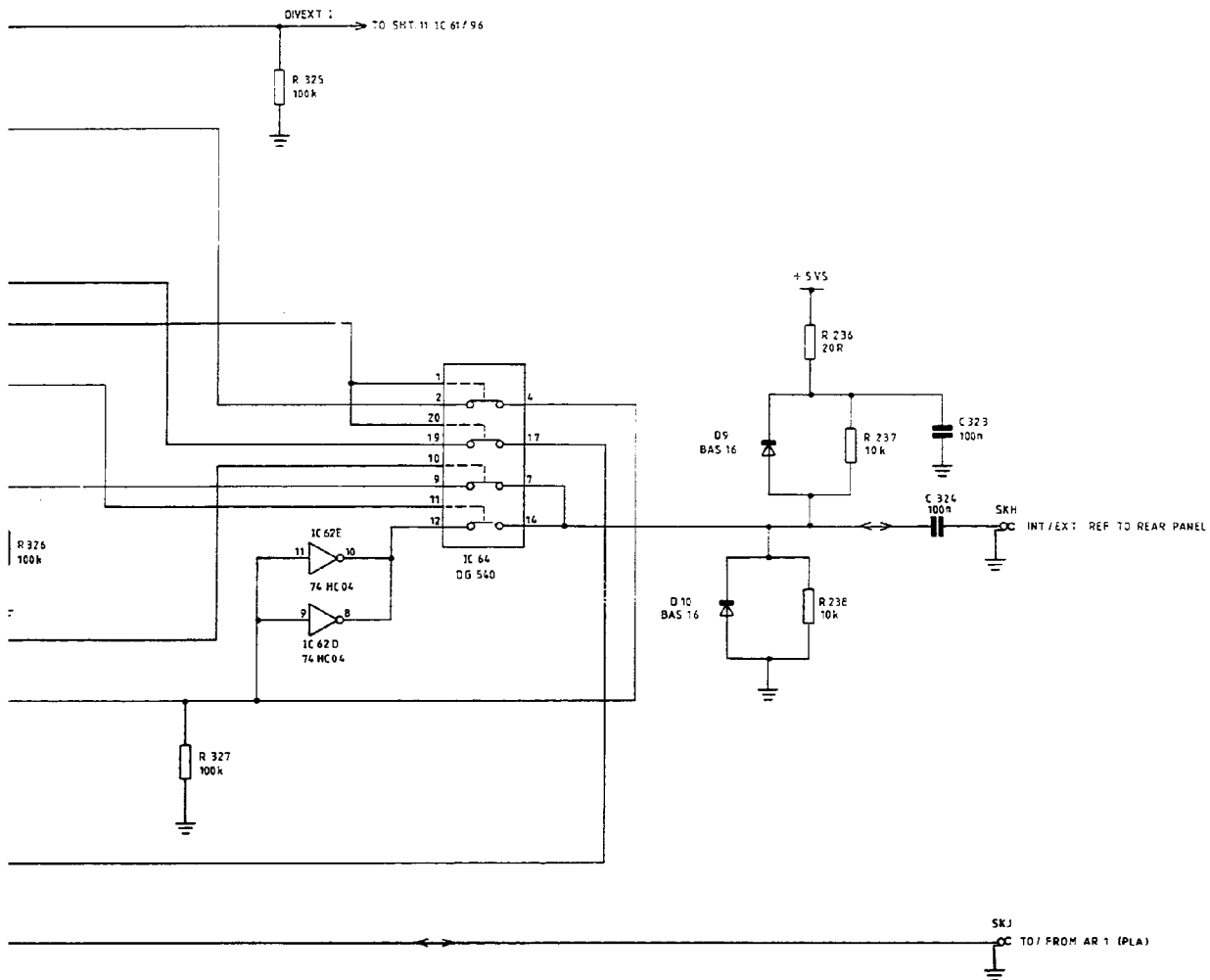
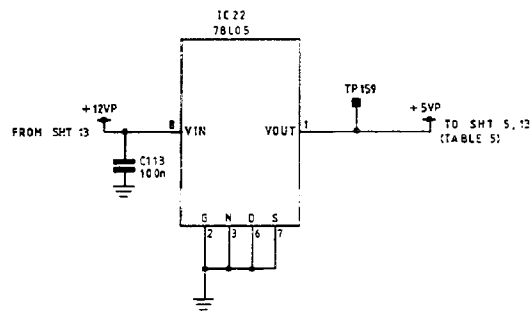
Circuit diagrams **A8**

Fig. 7-128 A8 Reference frequency switches - circuit



Circuit diagrams **A8**

1, 4, 10

3

10

13

J

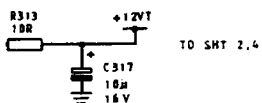
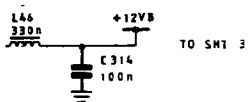
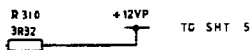
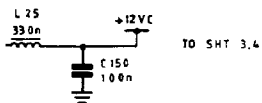


TABLE 1—POWER SUPPLY & DECOUPLING				
IC No.	TYPE	+5V	GND	CAPACITOR
IC 26	USP	16, 26, 57	2, 10, 29, 49	C 205, 206, 207
IC 32	DSP	16, 26, 57	2, 10, 29, 49	C 208, 209, 210
IC 38	DSP	16, 26, 57	2, 10, 29, 49	C 211, 212, 213
IC 47	DSP	16, 26, 57	2, 10, 29, 49	C 214, 215, 216
IC 30	FX740	17, 18, 35, 51, 52	1, 21, 34, 54, 68	C 217, 218, 219, 220, 221
IC 36	FX740	17, 18, 35, 51, 52	1, 21, 34, 54, 68	C 222, 223, 224, 225, 226
IC 44	FX740	17, 18, 35, 51, 52	1, 21, 34, 54, 68	C 227, 228, 229, 230, 231
IC 53	FX740	17, 18, 35, 51, 52	1, 21, 34, 54, 68	C 232, 233, 234, 235, 236
IC 31	FIFO	32	16	C 237
IC 37	FIFO	32	16	C 238
IC 27	SRAM	28	14	C 239
IC 28	SRAM	28	14	C 240
IC 29	SRAM	28	14	C 241
IC 33	SRAM	28	14	C 242
IC 34	SRAM	28	14	C 243
IC 35	SRAM	28	14	C 244
IC 39	SRAM	28	14	C 245
IC 40	SRAM	28	14	C 246
IC 41	SRAM	28	14	C 247
IC 42	SRAM	28	14	C 248
IC 43	SRAM	28	14	C 249
IC 45	SRAM	28	14	C 250
IC 46	SRAM	28	14	C 251
IC 48	SRAM	28	14	C 252
IC 49	SRAM	28	14	C 253
IC 50	SRAM	28	14	C 254
IC 51	SRAM	28	14	C 255
IC 52	SRAM	28	14	C 256
IC 54	SRAM	28	14	C 257
IC 55	SRAM	28	14	C 258
IC 57	REVFIFO	3, 15, 28, 40, 54, 66, 78, 92	4, 14, 26, 41, 52, 67, 89, 91	C 259, 260, 261, 262, 263, 264, 265, 266
IC 61	STE	20, 41, 60, 81, 100, 120, 142, 160	1, 10, 19, 29, 39, 51, 61, 70, 79, 91, 101, 110, 122, 131, 141, 151	C 267, 268, 269, 270, 271, 272, 273, 274

TABLE 2—POWER SUPPLY & DECOUPLING			
IC No.	TYPE	+5VS	CAPACITOR
IC 62	74HC04	14	C 276 (10n)

TABLE 3—POWER SUPPLY & DECOUPLING			
IC No.	TYPE	+5VT	CAPACITOR
IC 20	74F74	14	C171

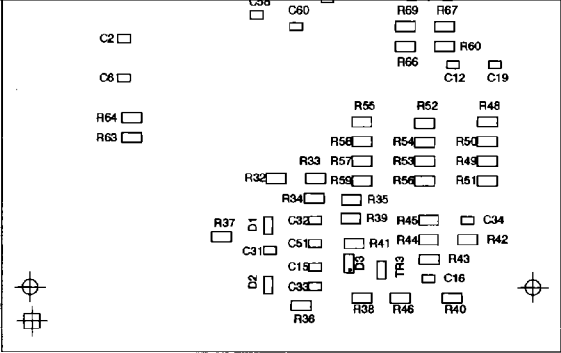
TABLE 4—POWER SUPPLY & DECOUPLING			
IC No.	TYPE	+5VBDIG	CAPACITOR
IC 1	74AC161	16	C200
IC 8	74AC04	14	C37

TABLE 5—POWER SUPPLY & DECOUPLING			
IC No.	TYPE	+5VP	CAPACITOR
IC 69	74AC04	14	C 322

TABLE 6—POWER SUPPLY & DECOUPLING				
IC No.	TYPE	+12VS	—5VS	CAPACITOR
IC 63	DG540	16	5	C 277 (+12VS), 278 (—5VS)
IC 44	DG540	16	5	C 279 (+12VS), 280 (—5VS)

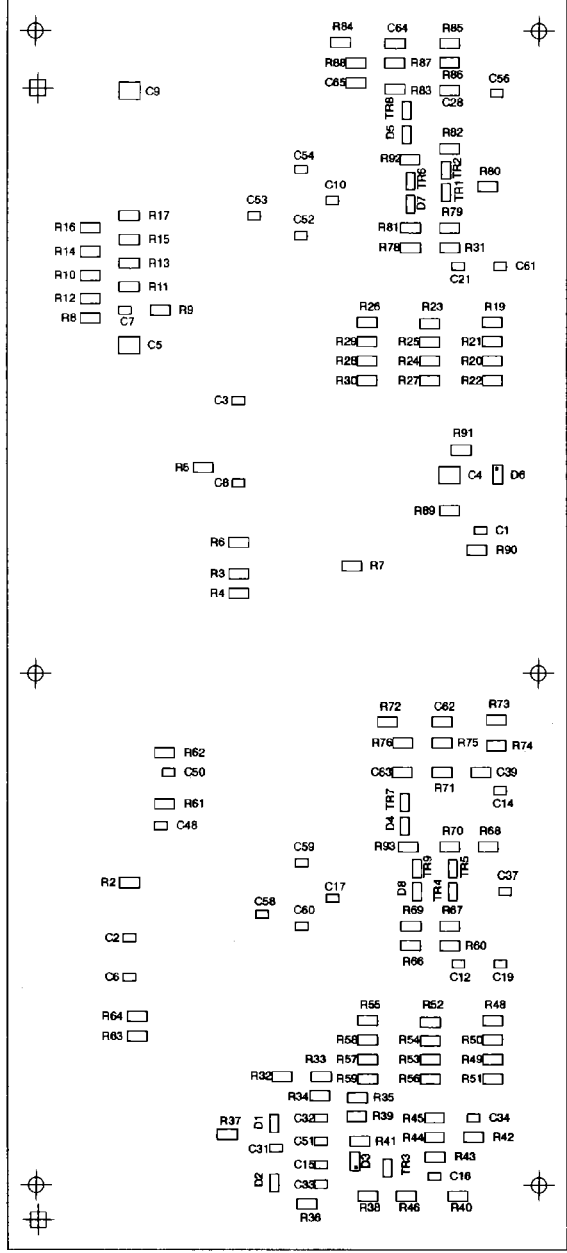
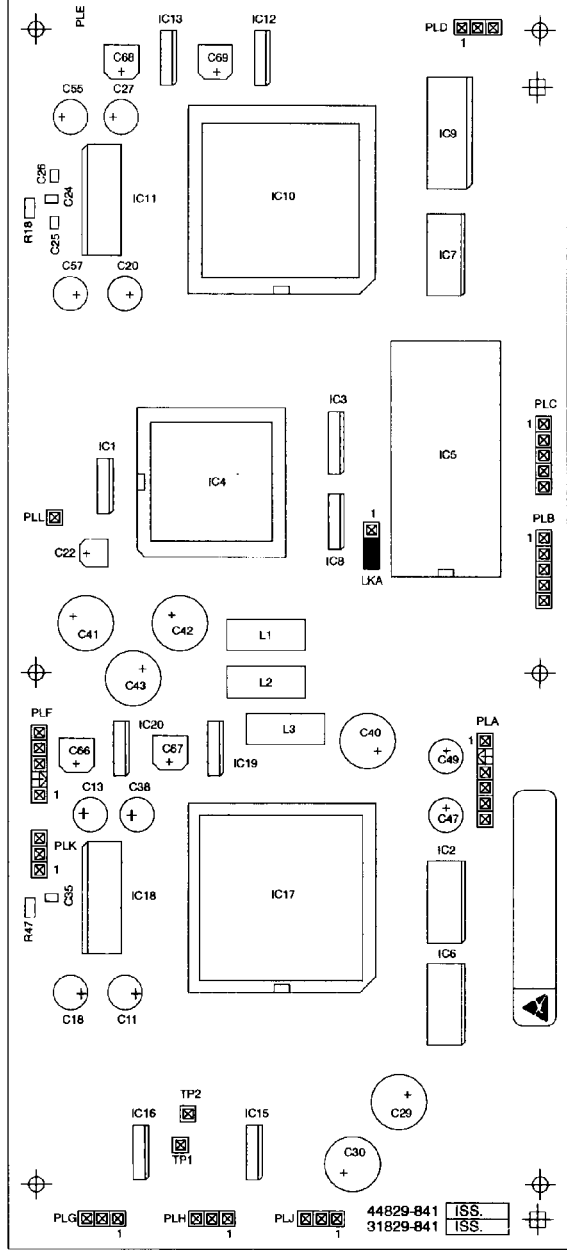
NOTE: ALL DECOUPLERS 100n UNLESS OTHERWISE STATED

Fig. 7-129 A8 Power supply and decoupling arrangements - circuit



Dr. No. 44829/841 Sheet 1 of 1

# Component layout AE1







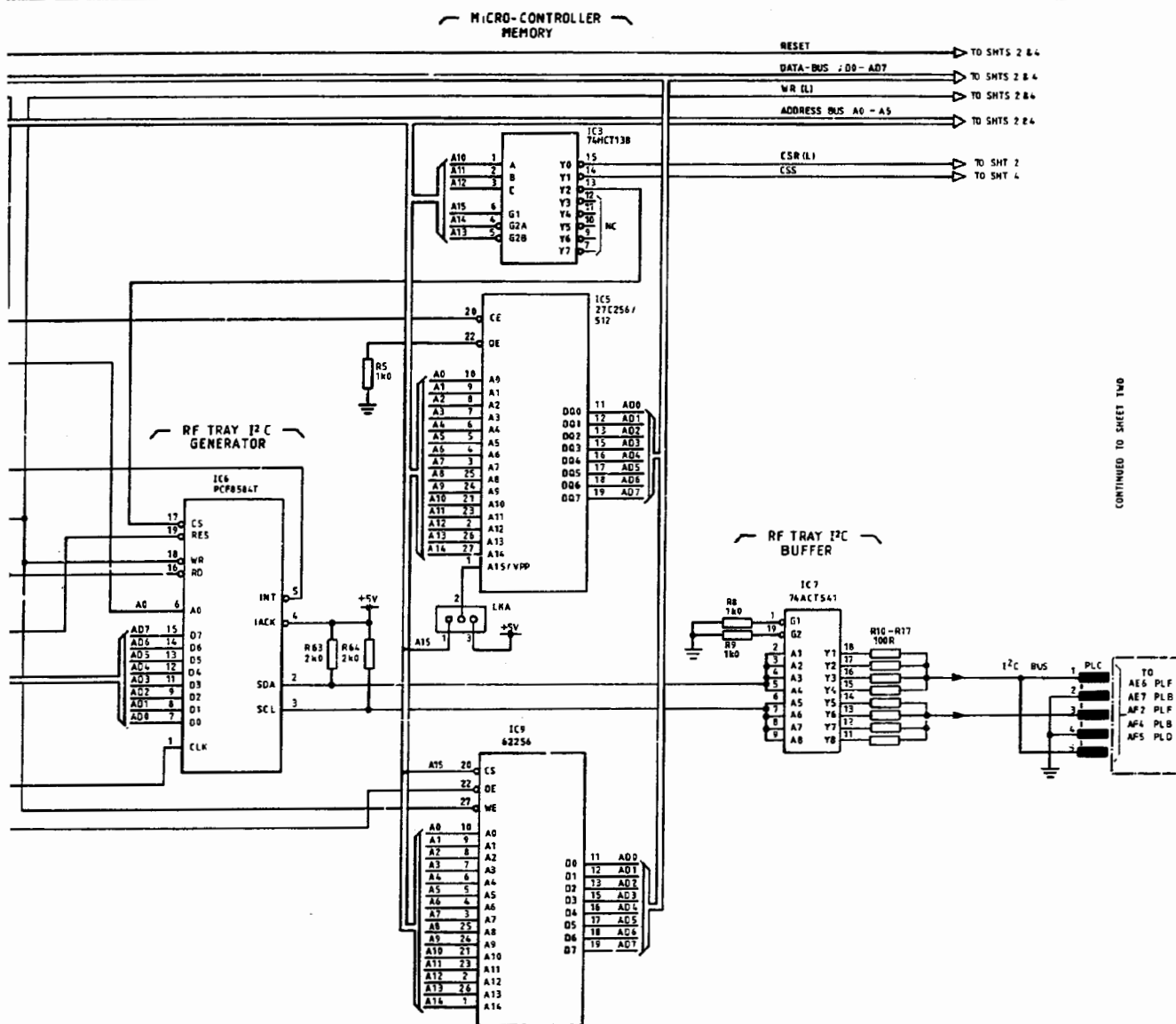
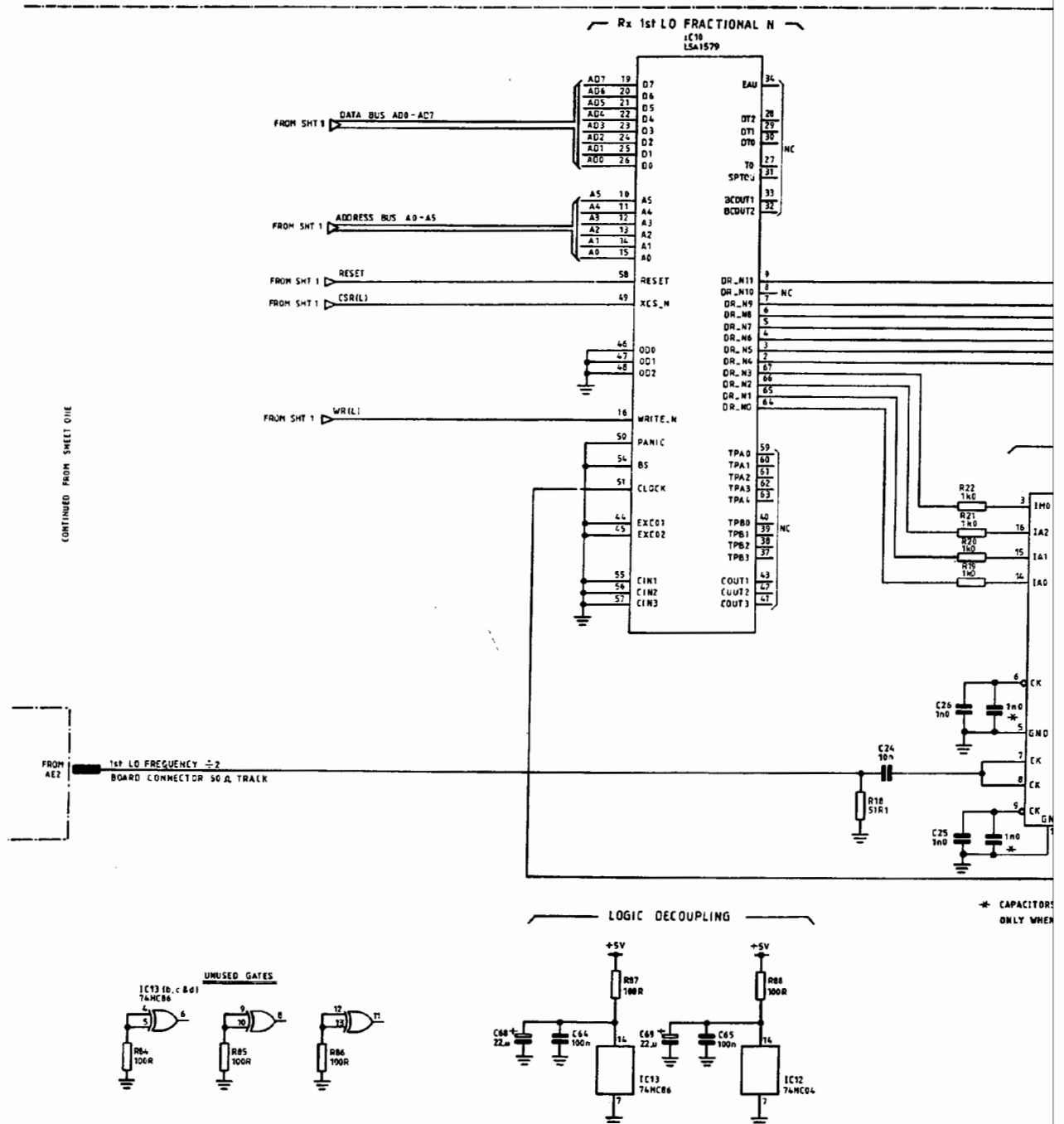
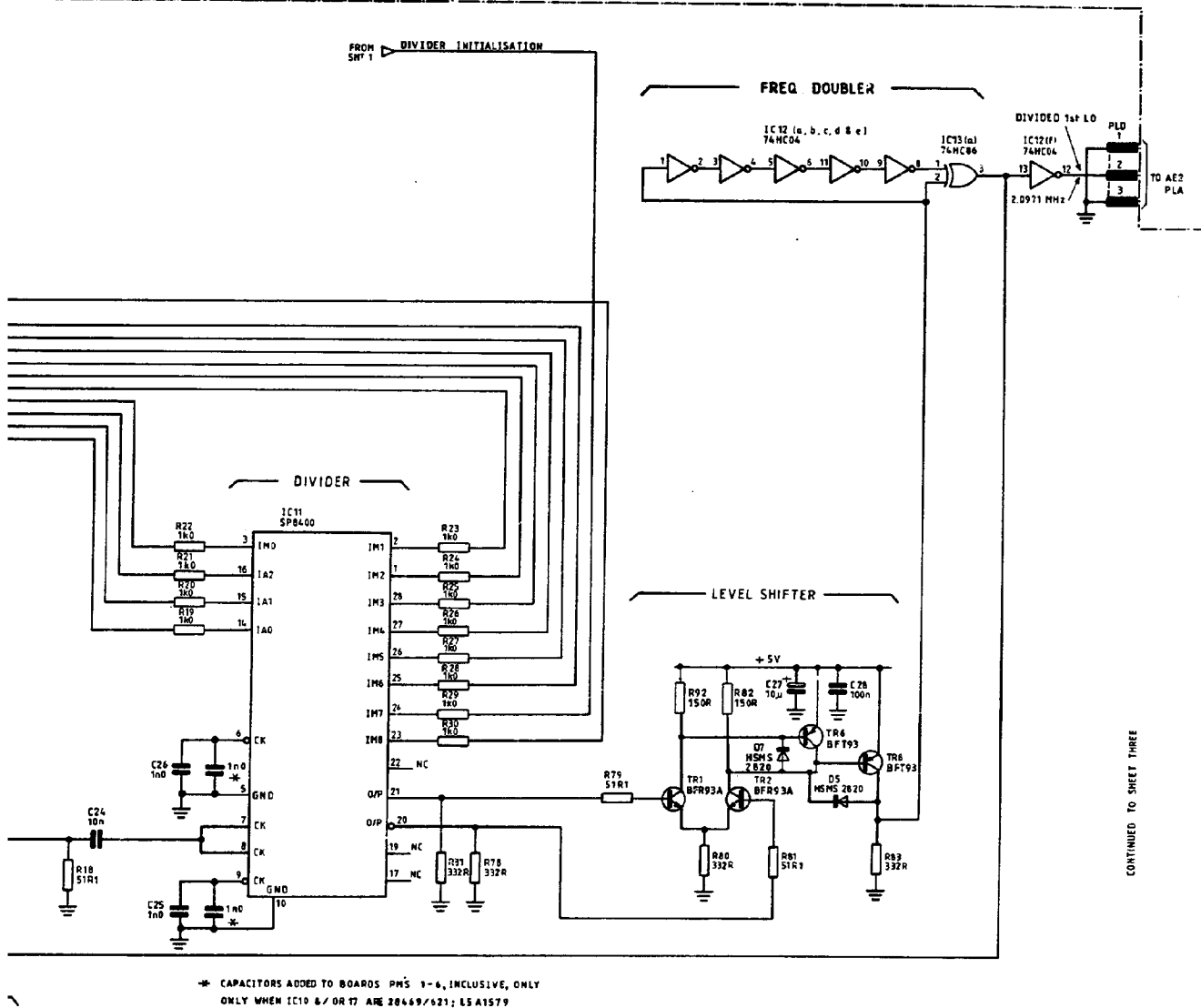
Circuit diagrams **AE1**

Fig. 7-131 AE1 Microcontroller - circuit



Circuit diagrams **AE1**

CONTINUED TO SHEET THREE

PART OF

AE1.

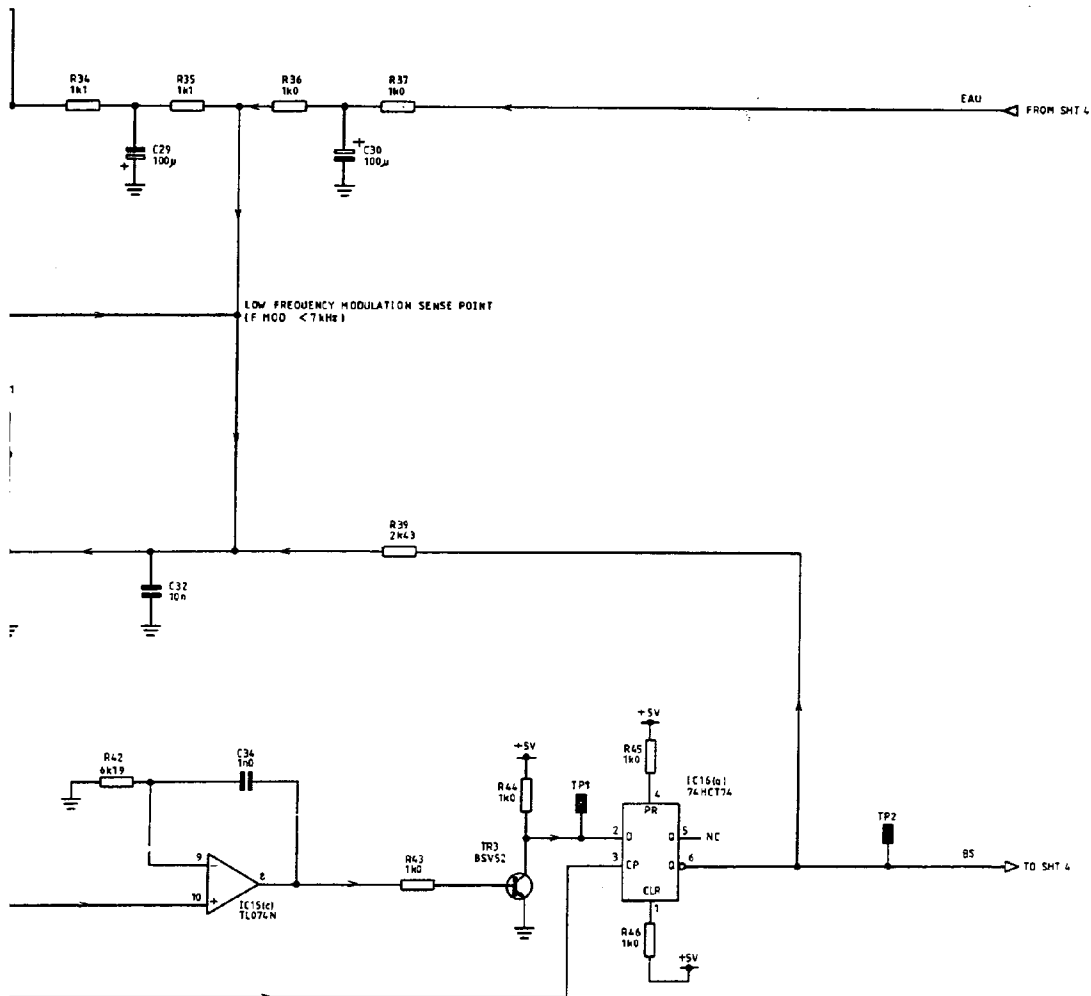
44829/067

Fig. 7-132 AE1 Rx fractional-N control - circuit



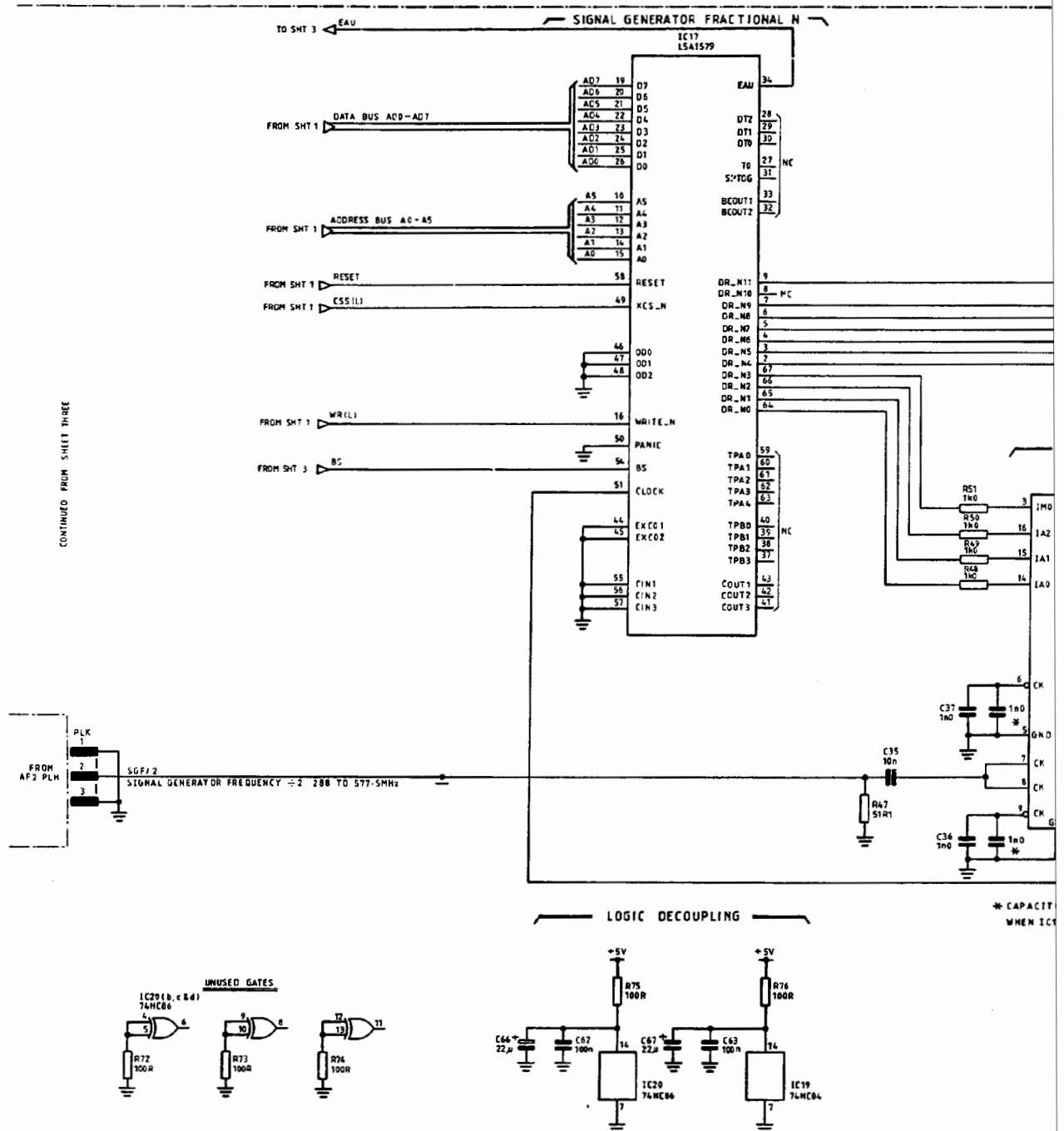
Circuit diagrams **AE1**

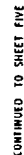
- LOW FREQUENCY FM LOOP



CONTINUED TO SHEET FOUR

Fig. 7-133 AE1 1-bit ADC - circuit





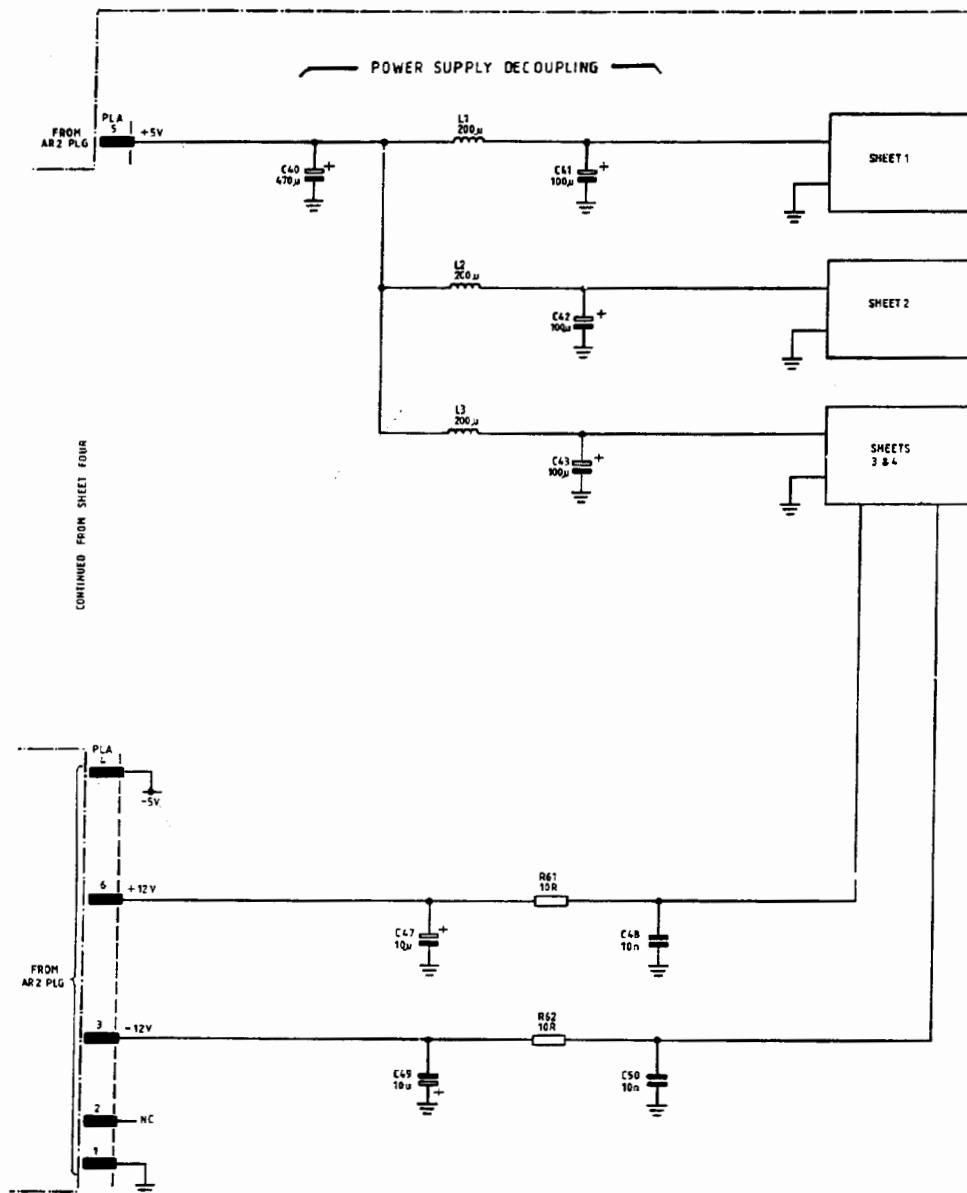
\* CAPACITORS ADDED TO BOARDS PMS 1-6, INCLUSIVE, ONLY  
WHEN IC10 & /OR 17 ARE 28469/621; L5A1579

PART OF

**AE1**

44829/841

7-217





Circuit diagrams **AE1**

SHEET 1

SHEET 2

SHEETS  
3 & 4

SUPPLY LINE TABLE				
IC	+5V	GND	DEC	CAP
IC1	14	7	C1	10n
IC2	20	10	C2	10n
IC3	16	8	C3	10n
IC4	44	22	C4	47n
IC5	20	14	C5	47n
IC6	20	10	C6	10n
IC7	20	10	C7	10n
IC8	14	7	C8	10n
IC9	20	14	C9	47n
IC10	17	1	C10	10n
"	36	18	C52	10n
"	53	35	C53	10n
"	60	52	C54	10n
IC11	11, 12	13	C20	10μ
"	11, 12	13	C21	1n0
"	4	10	C55	10μ
"	4	10	C56	1n0
"	18	5	C57	10μ
"	18	5	C61	1n0
IC15	—	—	C35	10n
IC15	—	—	C51	10n
IC16	14	7	C16	10n
IC17	17	1	C17	10n
"	36	18	C58	10n
"	53	35	C59	10n
"	60	52	C60	10n
IC18	11, 12	13	C11	10μ
"	11, 12	13	C12	1n0
"	4	10	C13	10μ
"	4	10	C14	1n0
"	18	5	C18	10μ
"	18	5	C19	1n0

ALL IC's DECOUPLED AT SUPPLY  
TO GROUND AS INDICATED

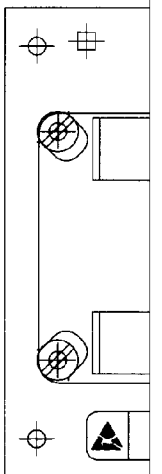
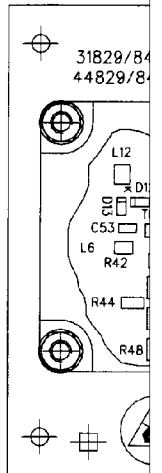
PART OF

AE1

44829/BA1

Fig. 7-135 AE1 Power supplies - circuit

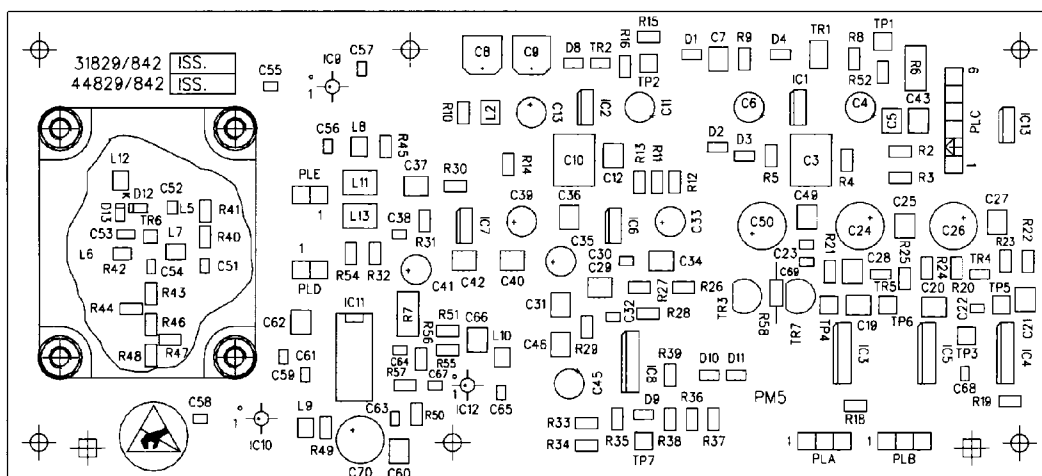
## SERVICING DIAGRAMS



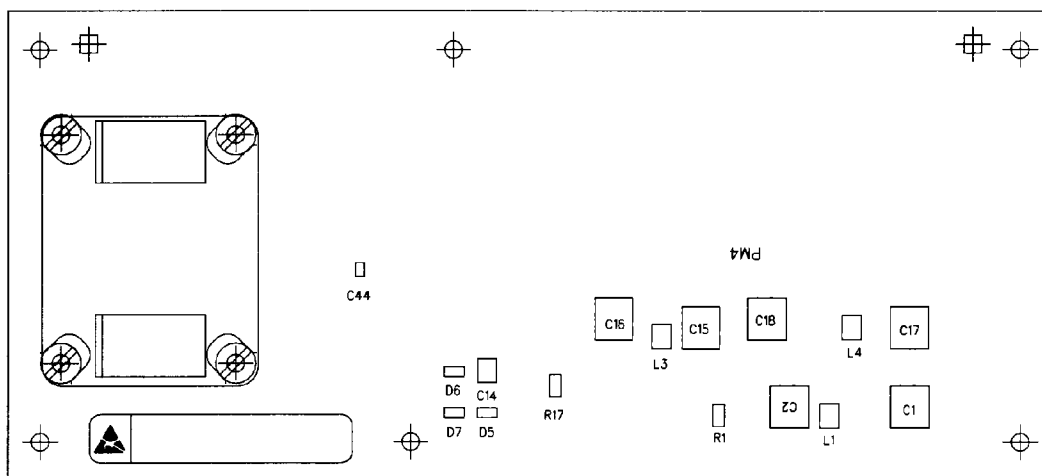
Power supplies **AE1**

Drg. No. 44829/842

# Component layout AE2



COMPONENT SIDE

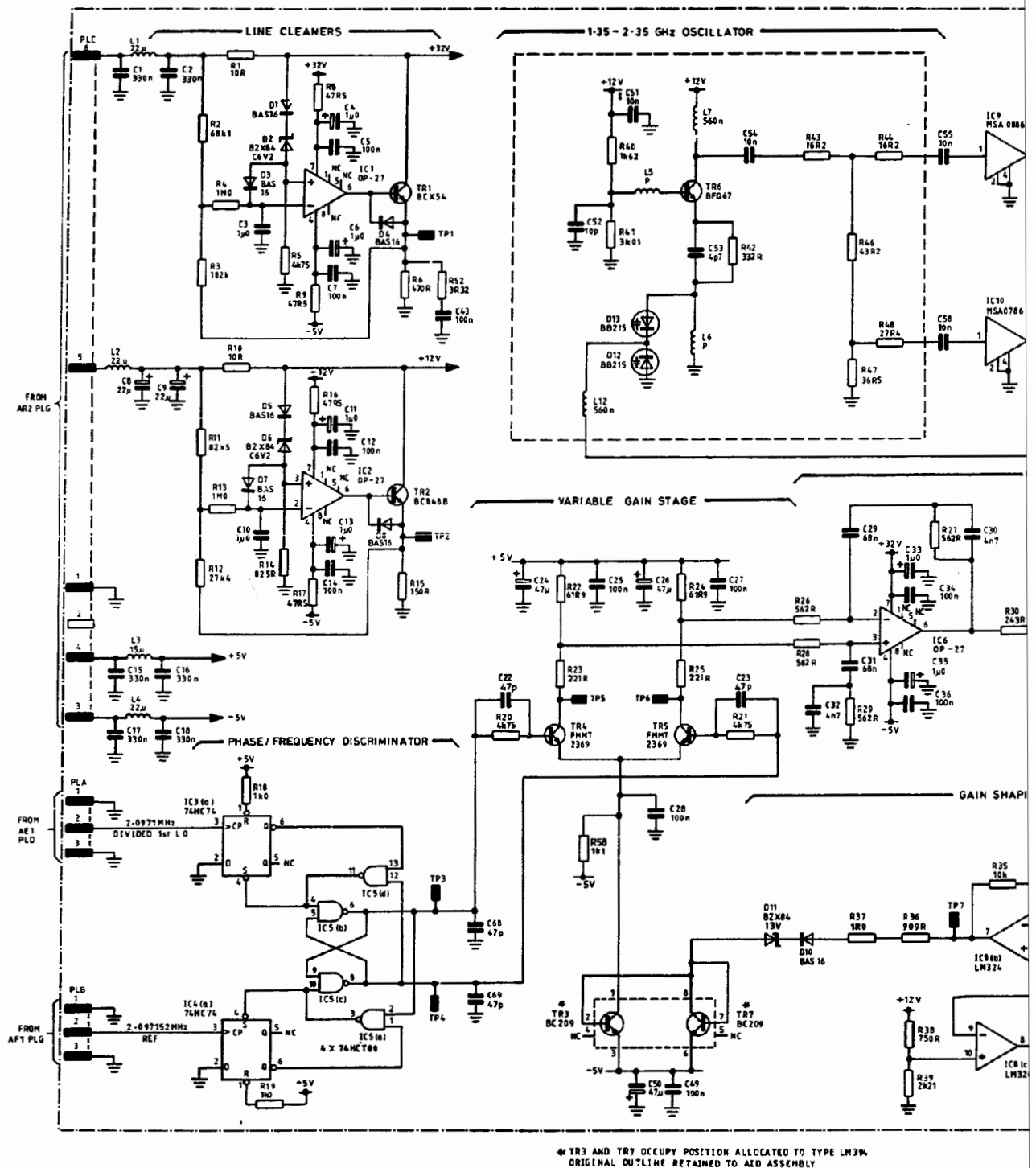


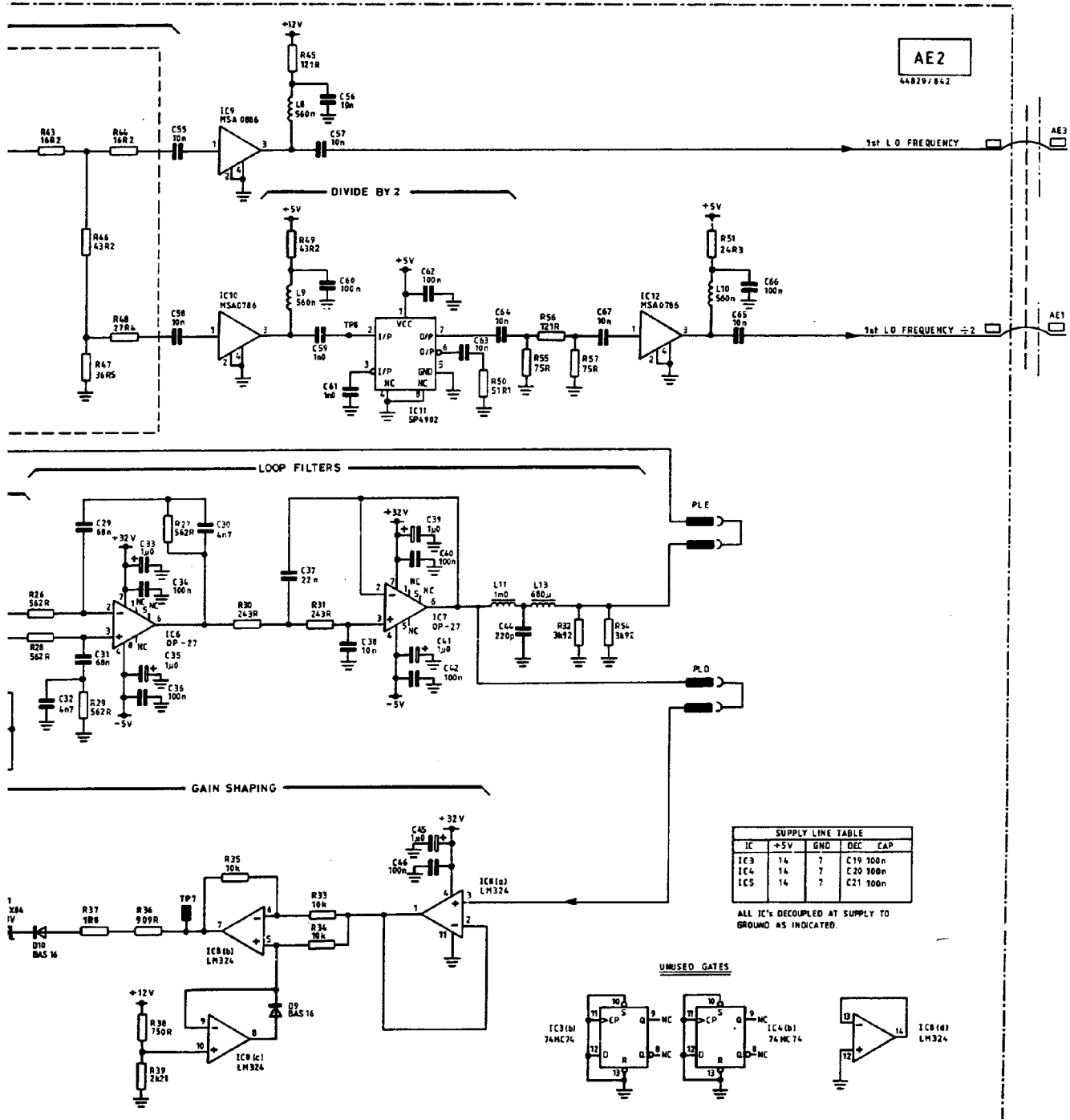
SOLDER SIDE

**AE1**

Drg. No. 44829/842 Sheet 1 of 1 Issue 11

Fig. 7-136 AE2 1st LO synthesizer - component layout

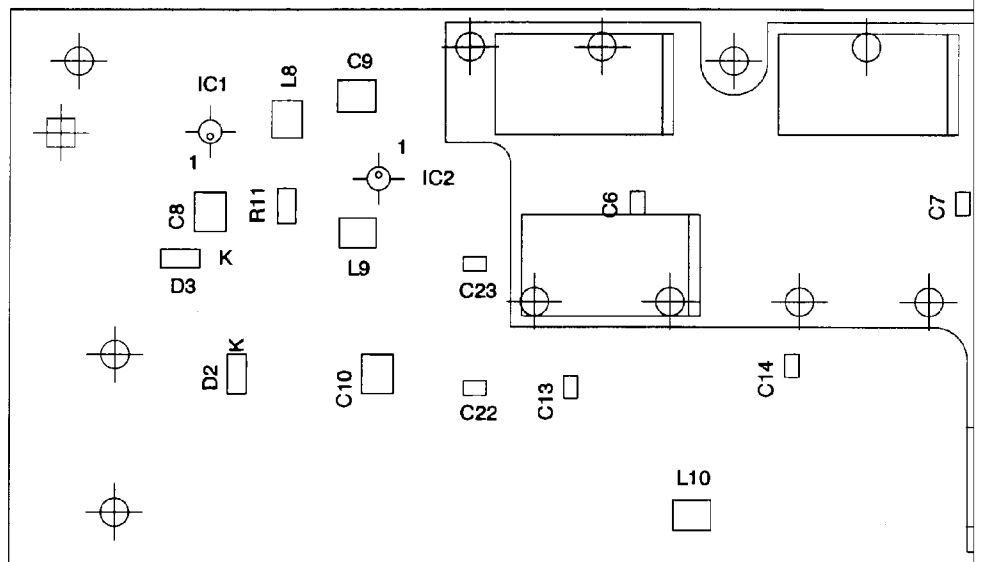
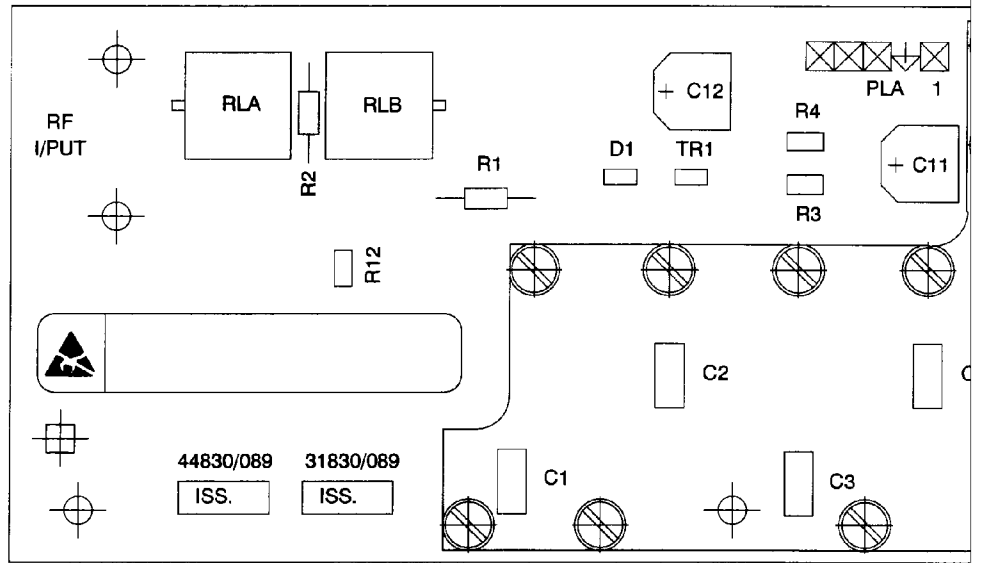


Circuit diagram **AE2**

1ED TO TYPE LM324  
SSEMBLY

Fig. 7-137 AE2 1st LO synthesizer - circuit

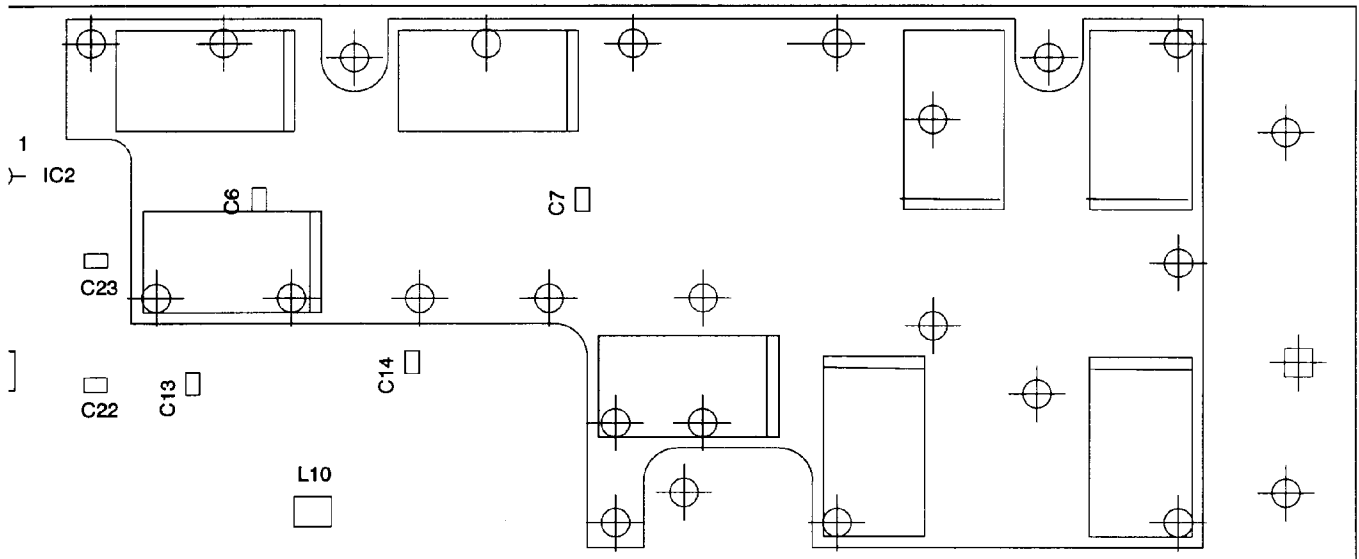
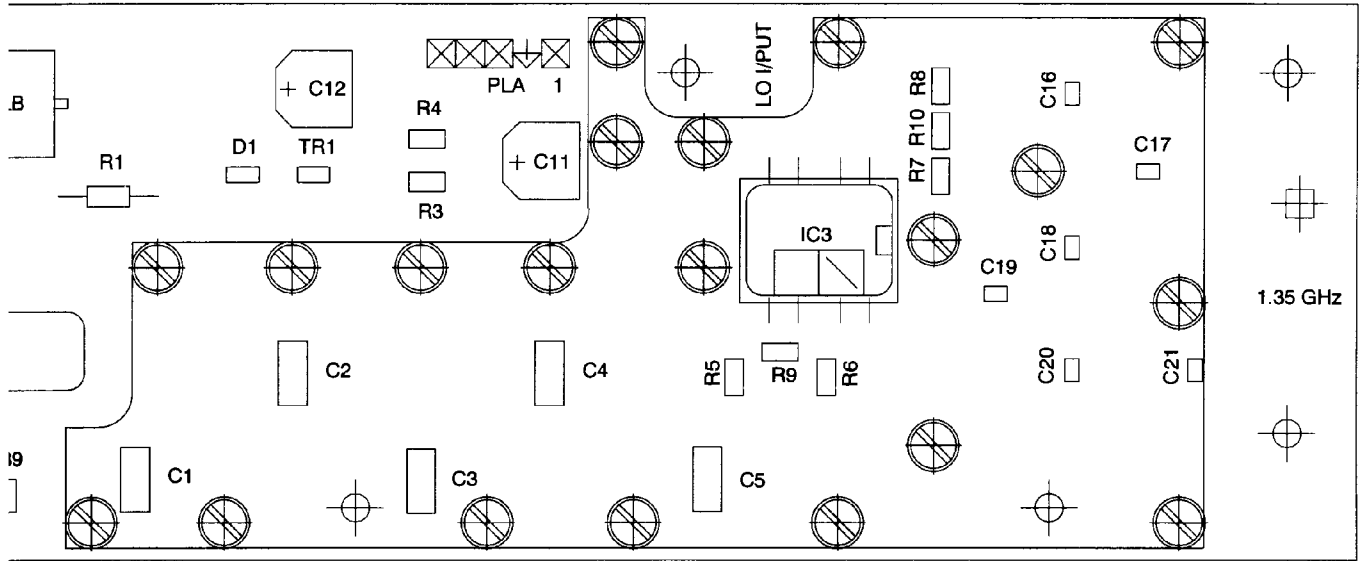
# SERVICING DIAGRAMS



**1st LO synthesizer AE2**

Drg. No. 44830/089 Sheet 1 of 1 Issue 5

## Component layout **AE3/2**

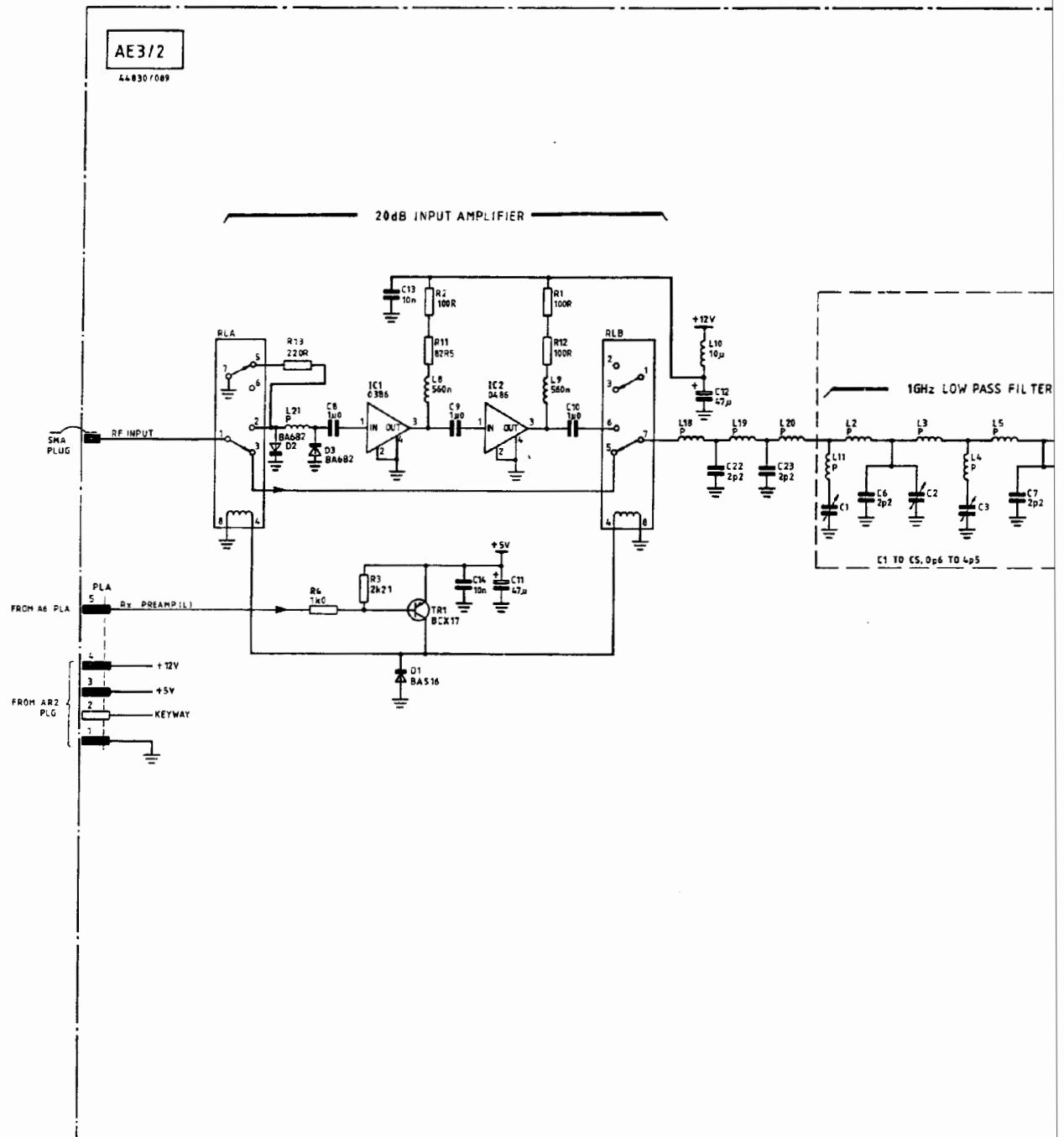


**E2**

Drg. No. 44830/089 Sheet 1 of 1 Issue 5

Fig. 7-138 AE3/2 1st mixer - component layout

46882-168





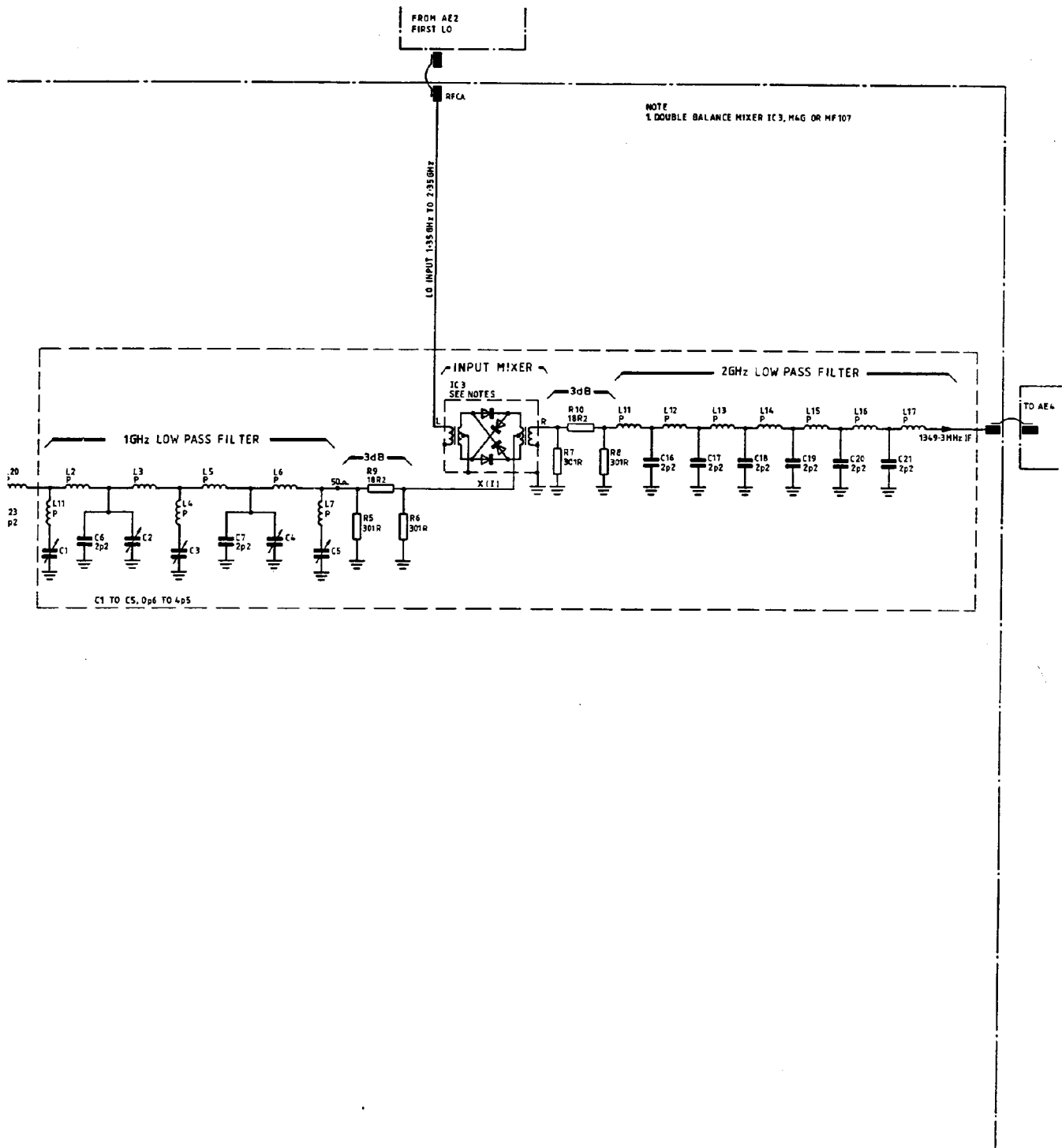
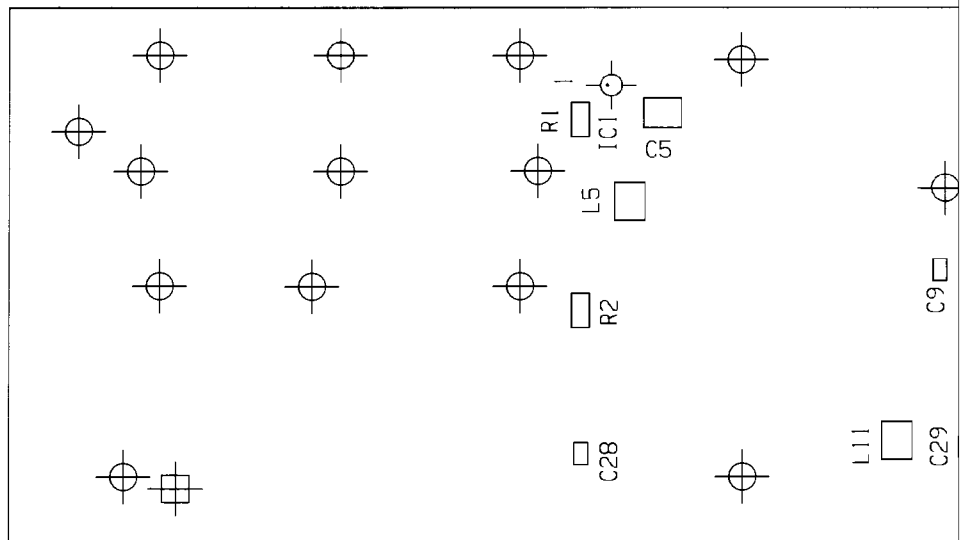
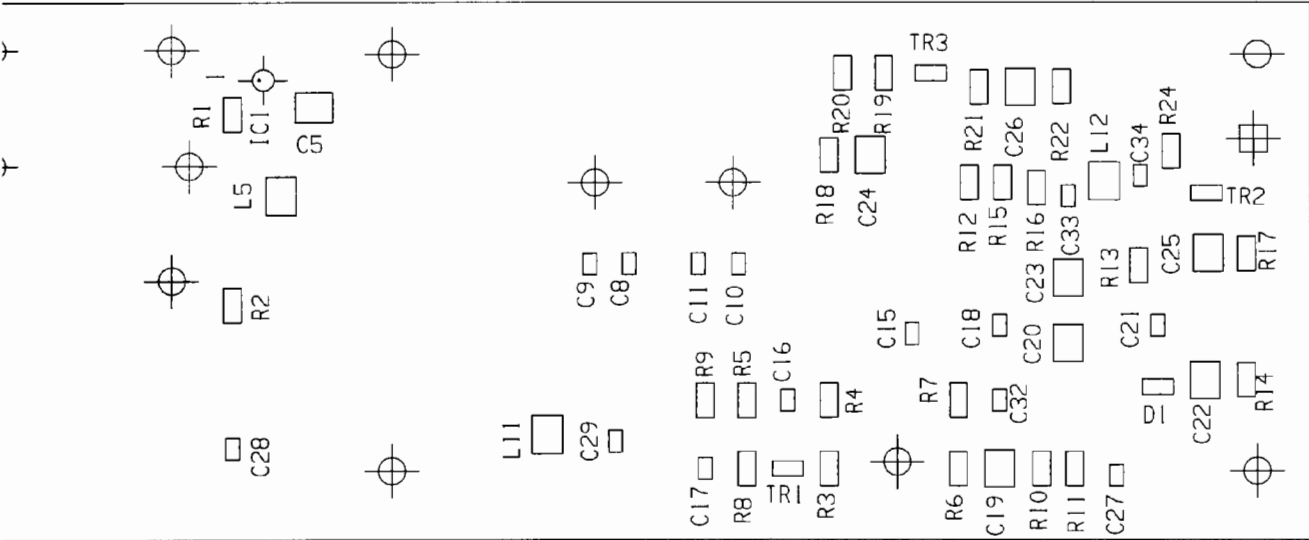
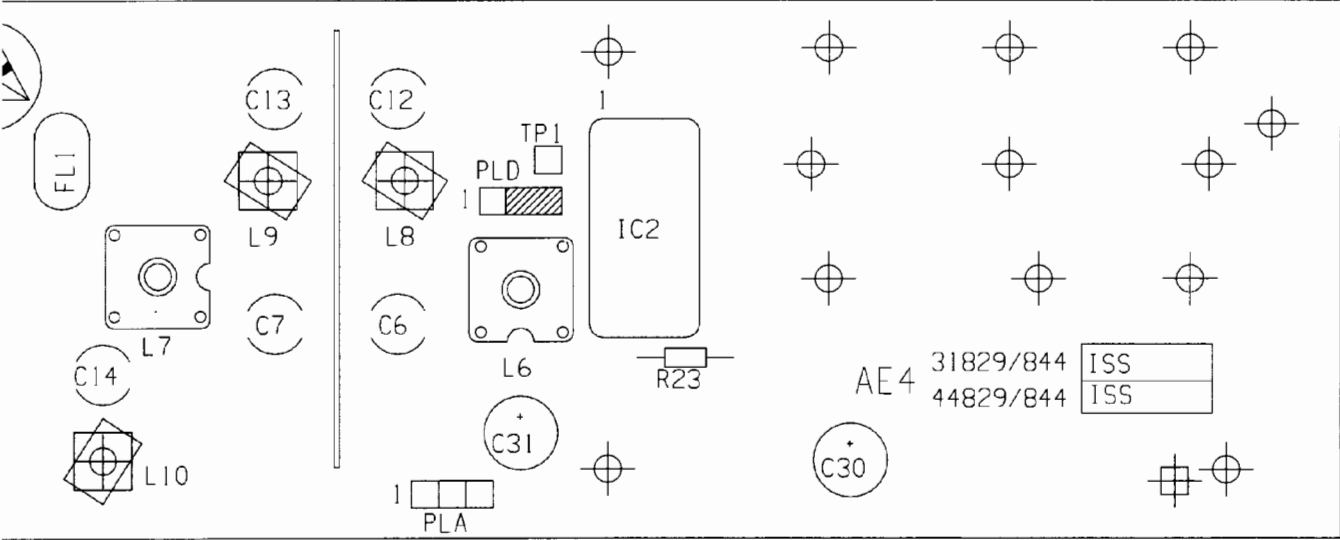
Circuit diagram **AE3/2**

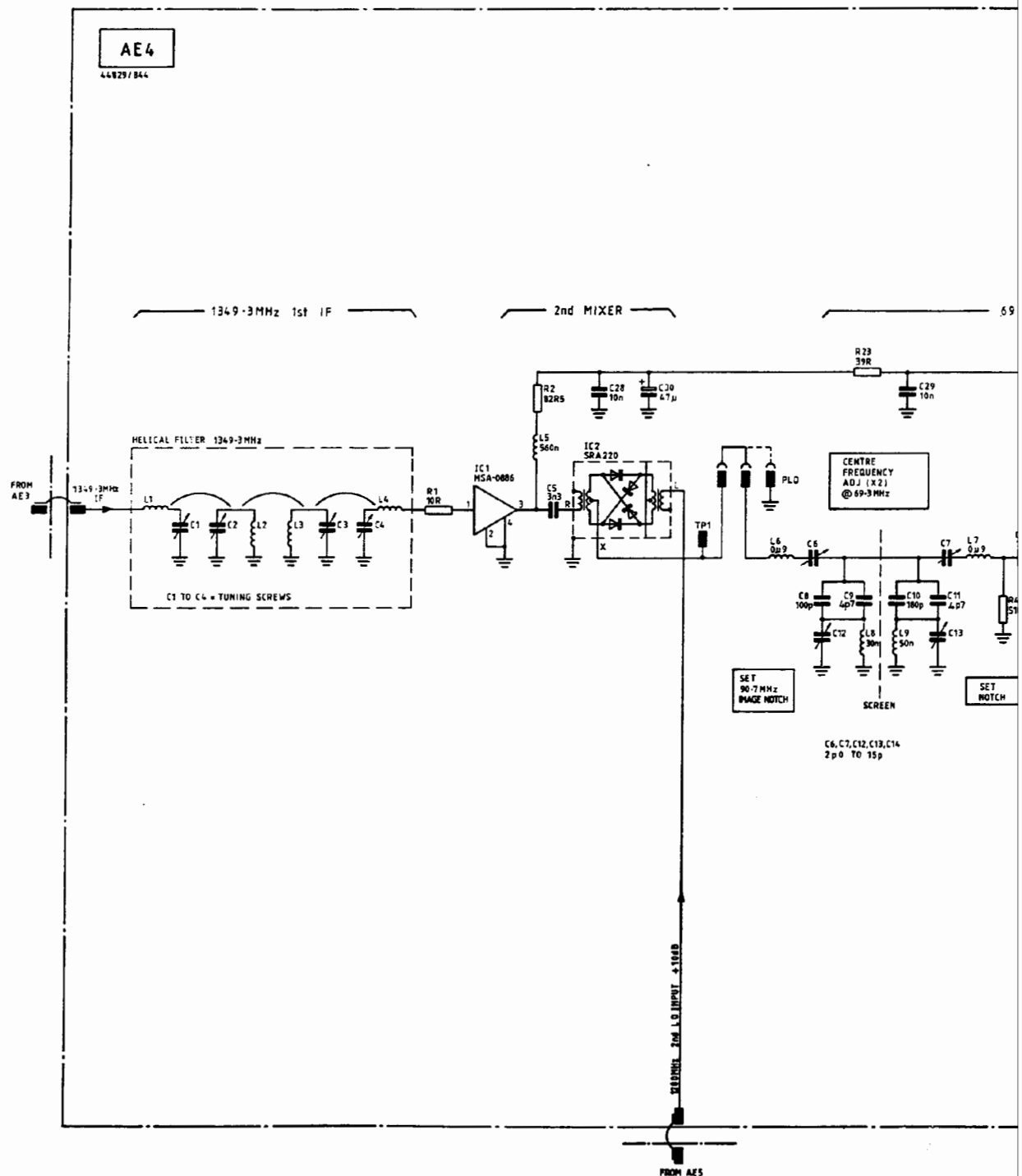
Fig. 7-139 AE3/2 1st mixer - circuit

[illegible]

**7-224**

Component layout **AE4**





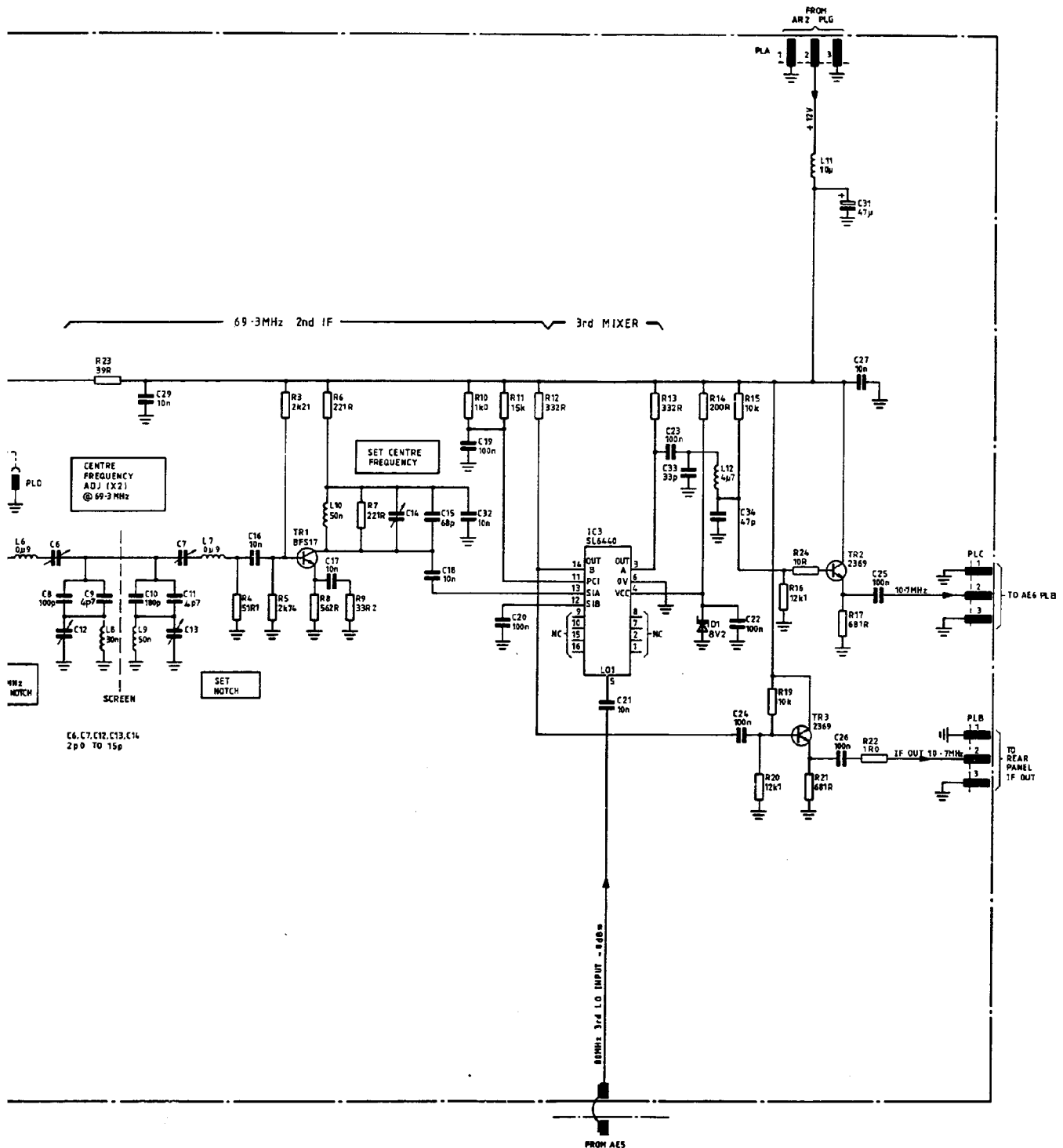
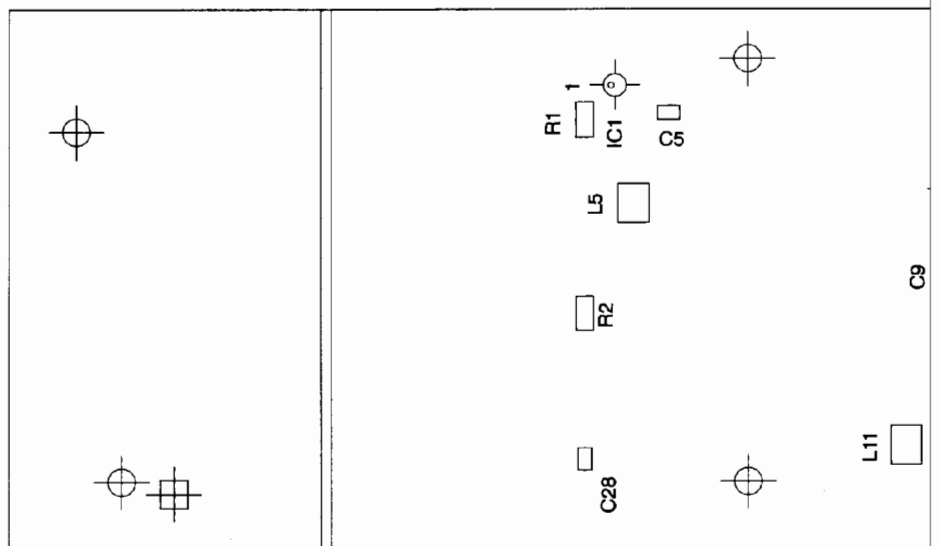
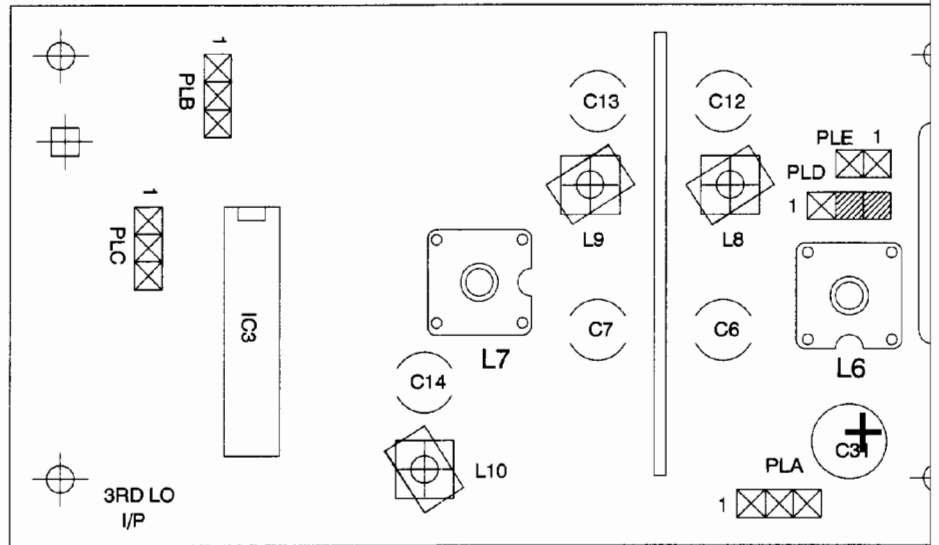
Circuit diagram **AE4**

Fig. 7-141 AE4 1st and 2nd IF, 2nd and 3rd mixers - circuit

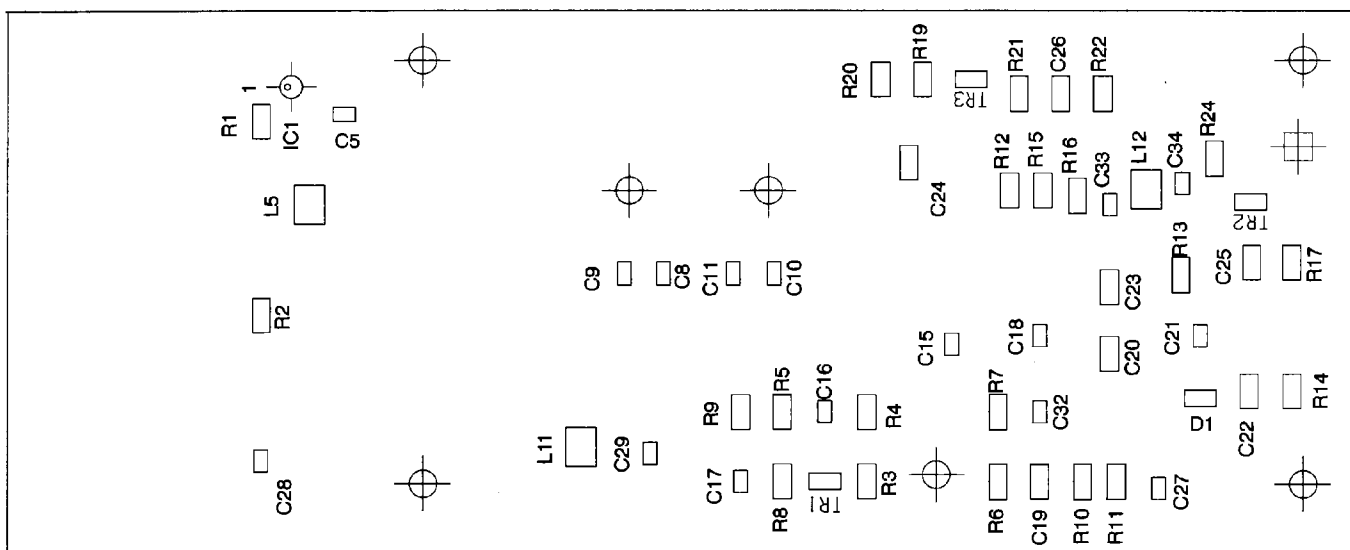
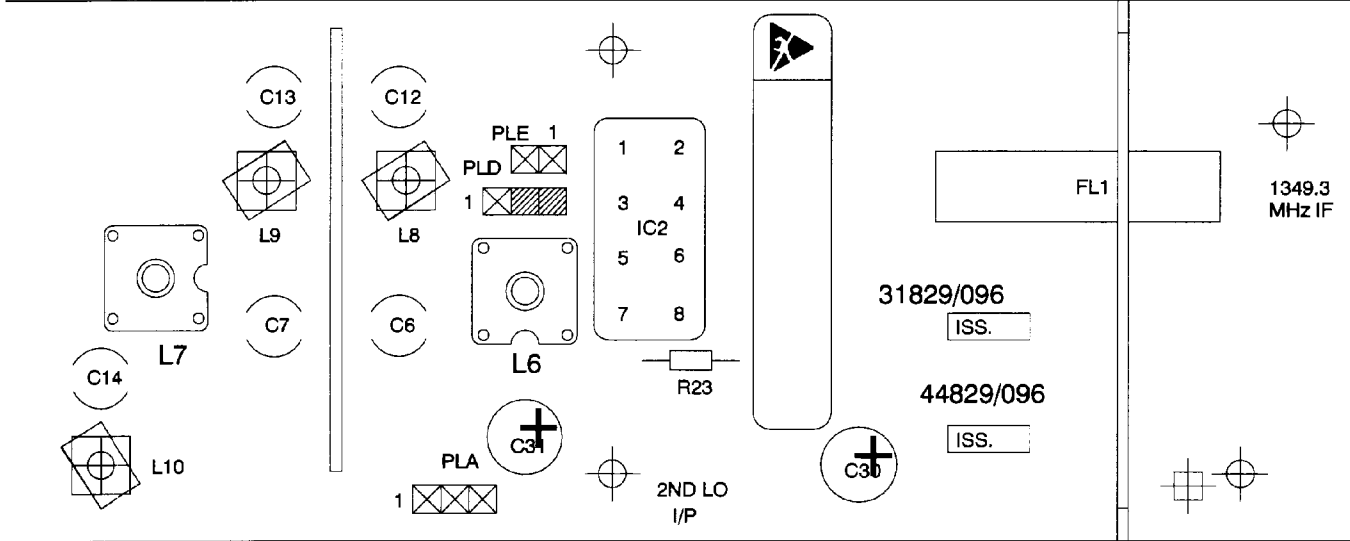
# SERVICING DIAGRAMS



1st and 2nd IF, 2nd and 3rd mixers **AE4**

Drg. No. 44830/096 Sheet 1 of 1 Issue 4

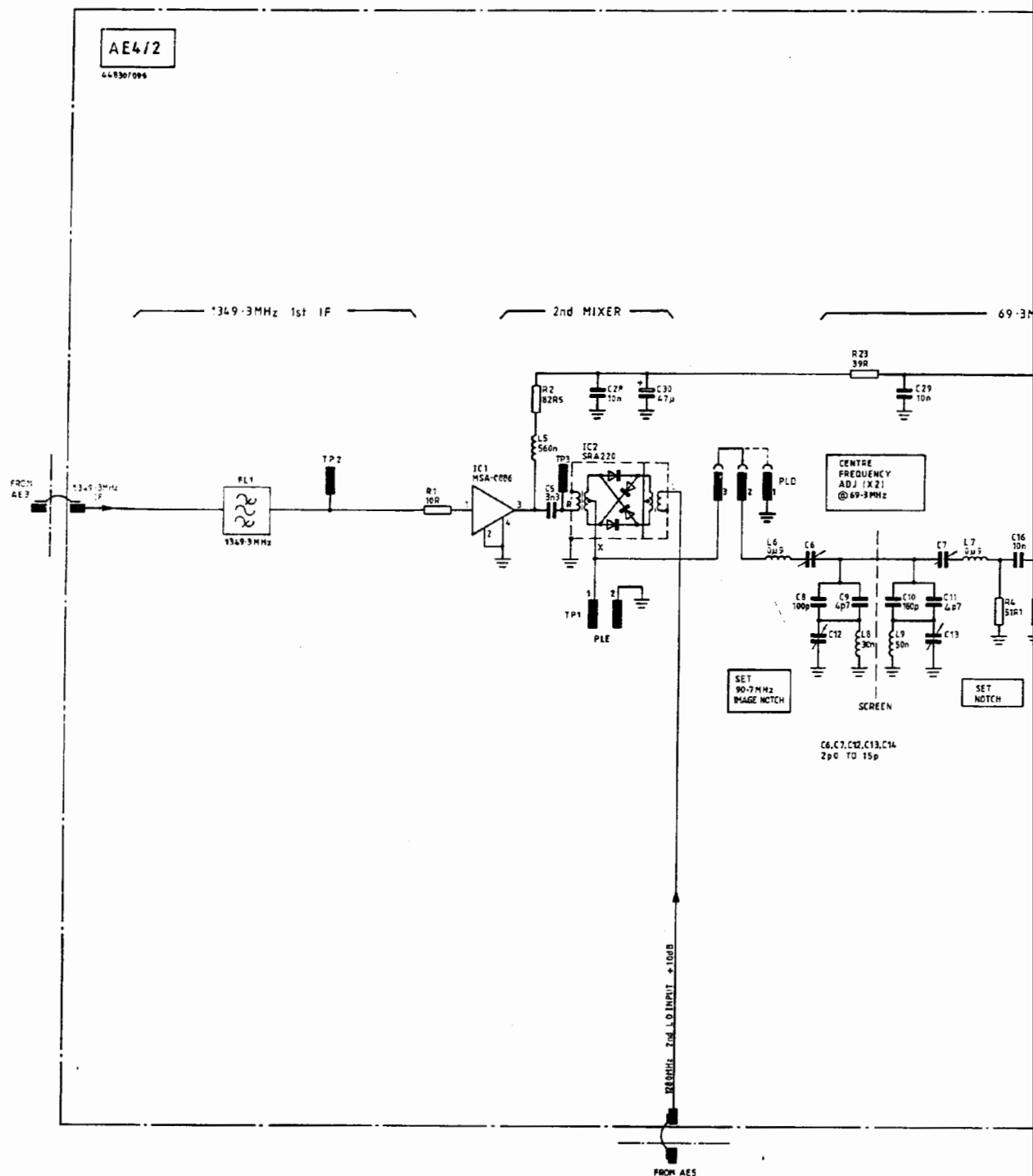
Component layout **AE4/2**



**AE4**

Drg. No. 44830/096 Sheet 1 of 1 Issue 4

Fig. 7-142 AE4/2 1st and 2nd IF, 2nd and 3rd mixers - component layout





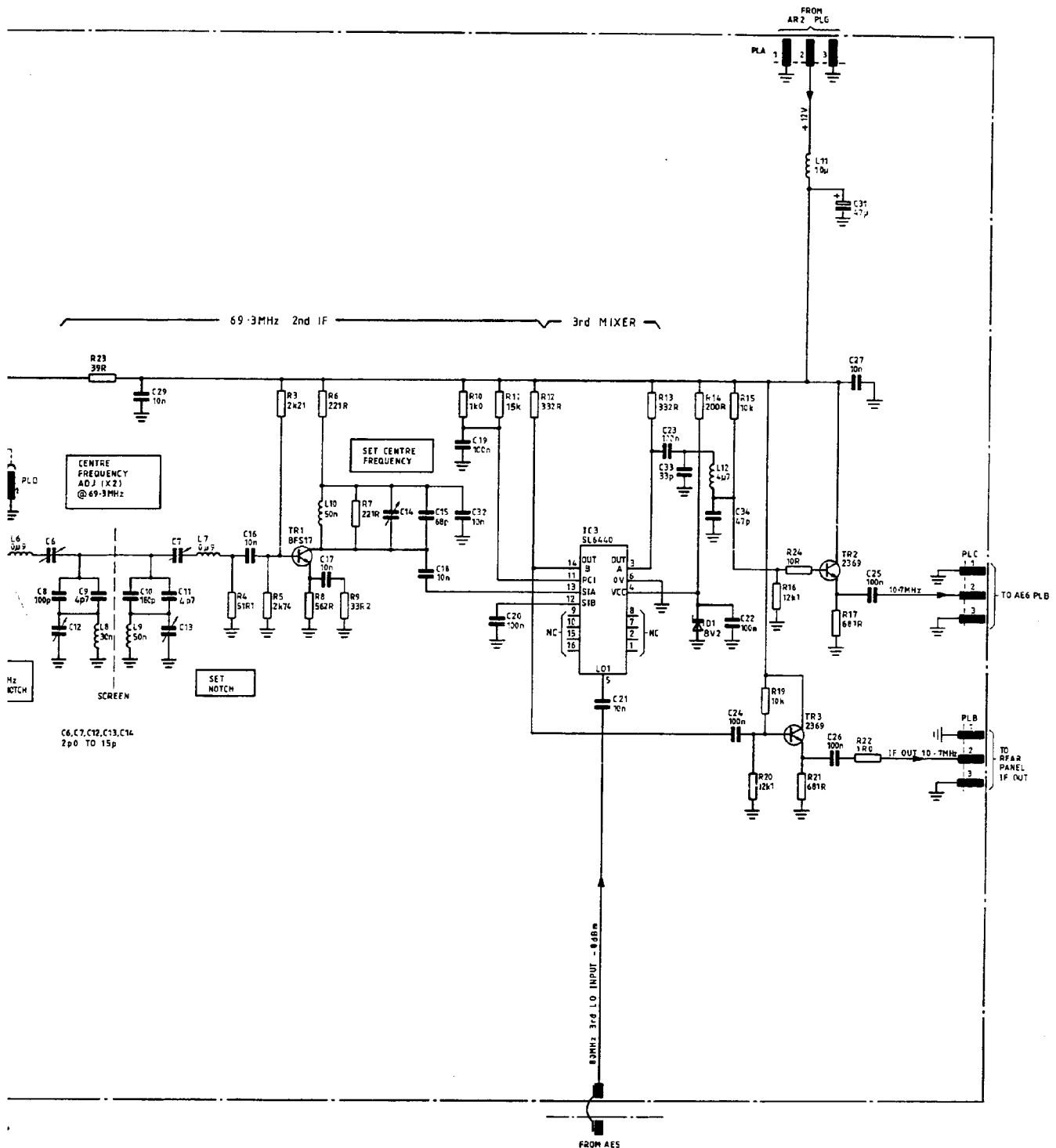
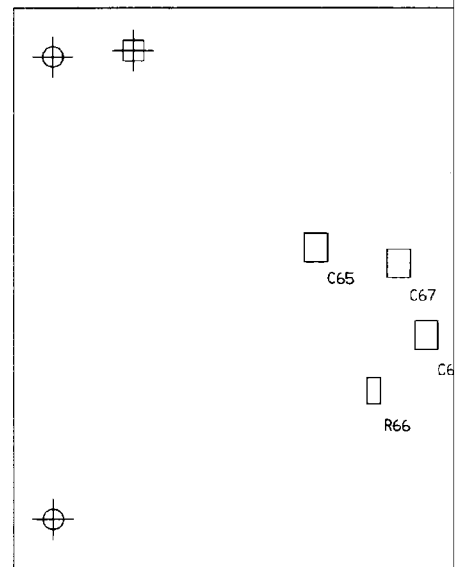
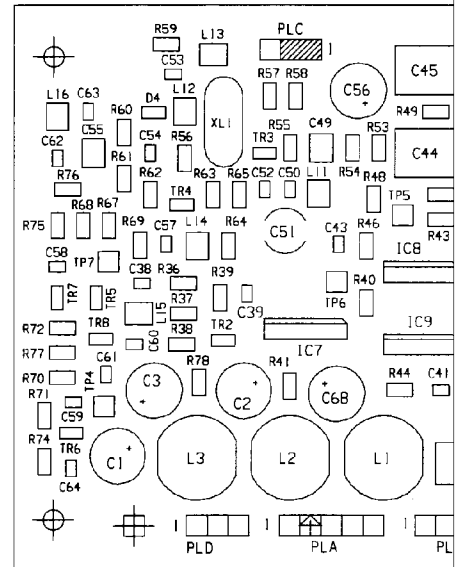
Circuit diagram **AE4/2**

Fig. 7-143 AE4/2 1st and 2nd IF, 2nd and 3rd mixers - circuit

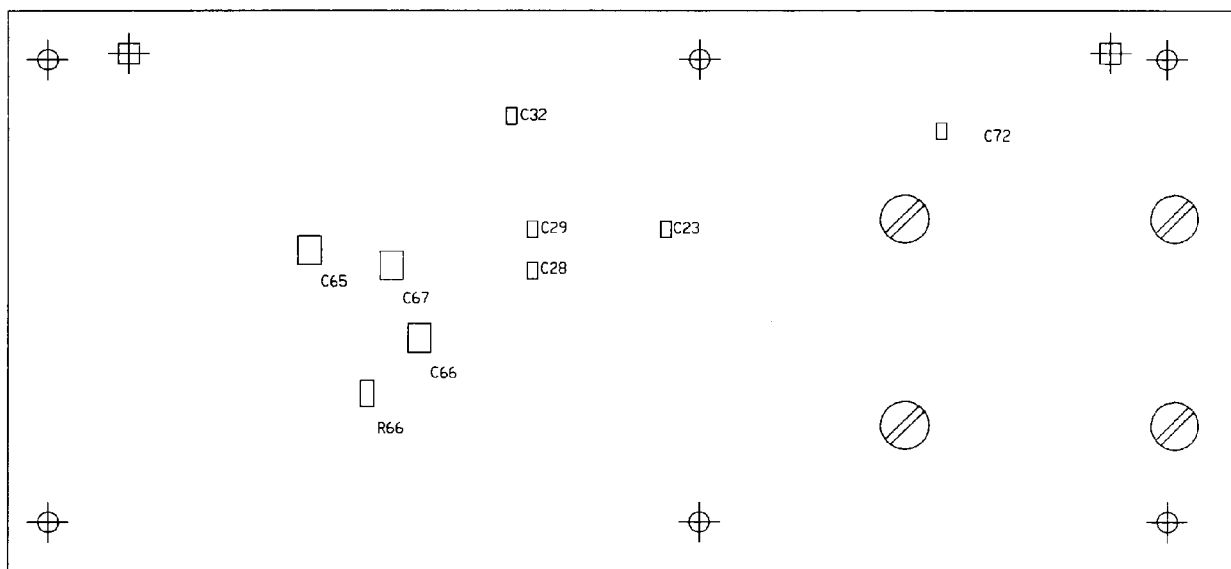
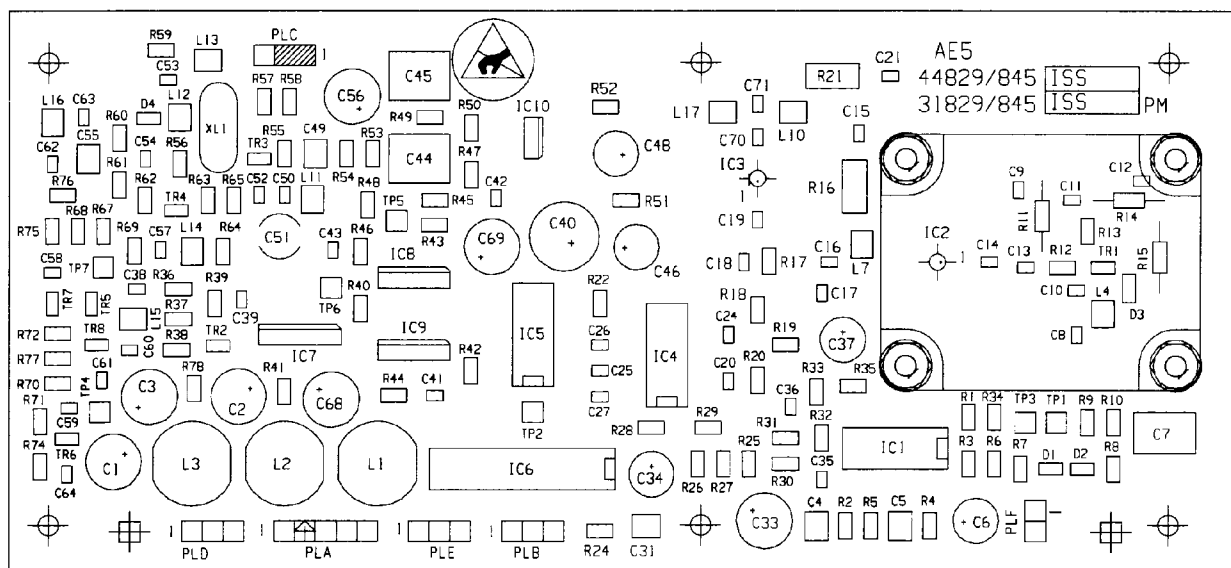
# SERVICING DIAGRAMS

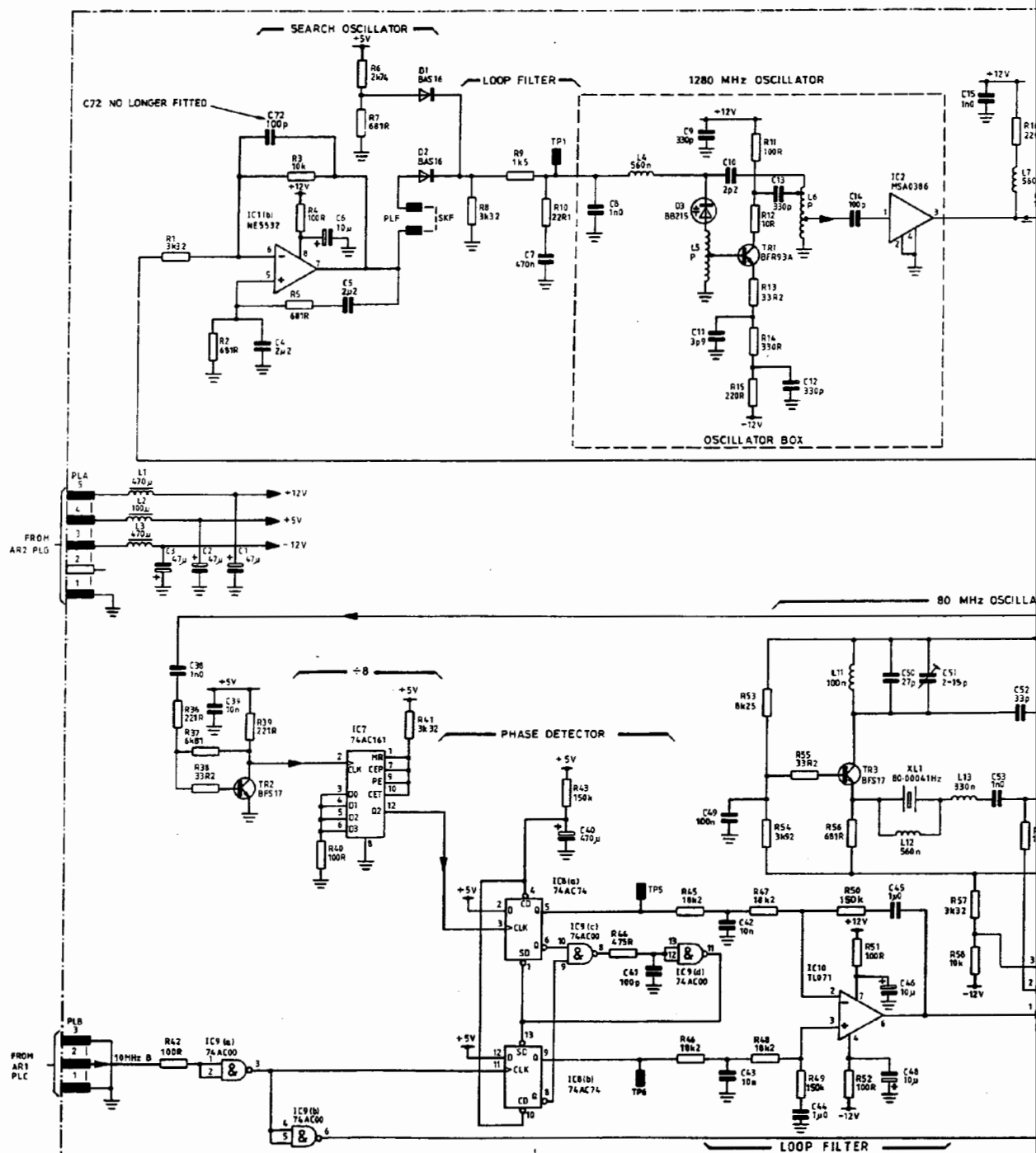


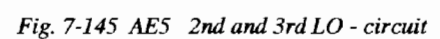
1st and 2nd IF, 2nd and 3rd mixers **AE4/2**

Drg. No. 44829/845 Sheet 1 of 1 Issue 7

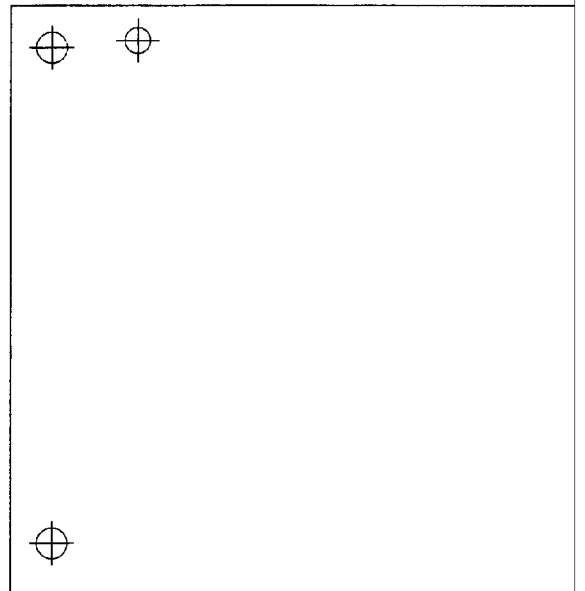
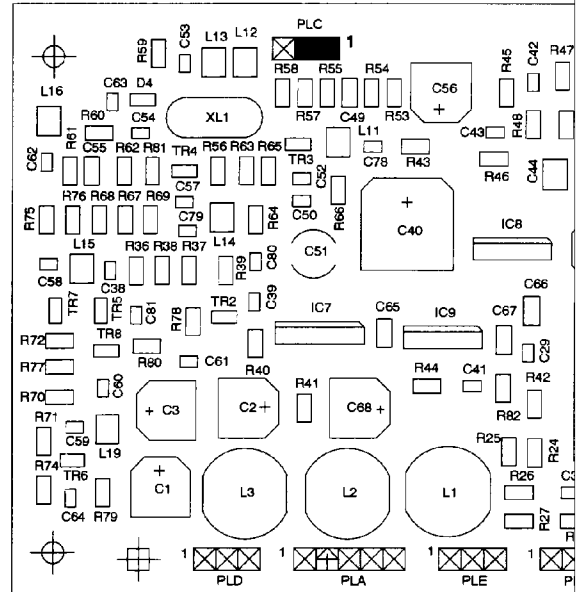
## Component layout **AE5**







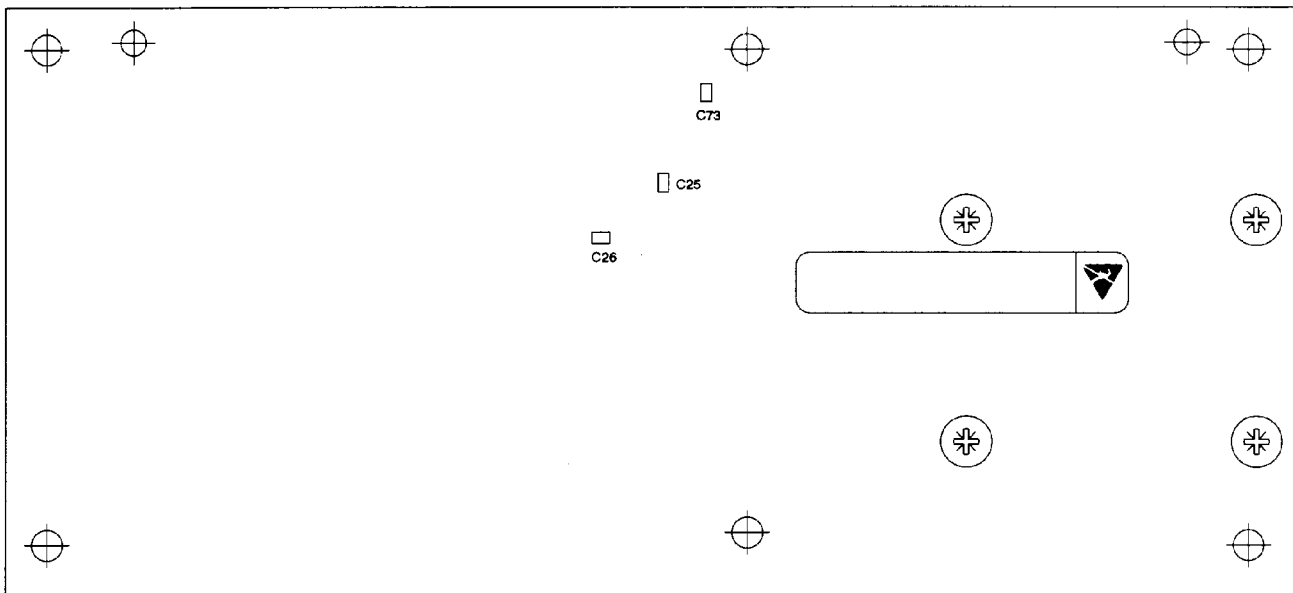
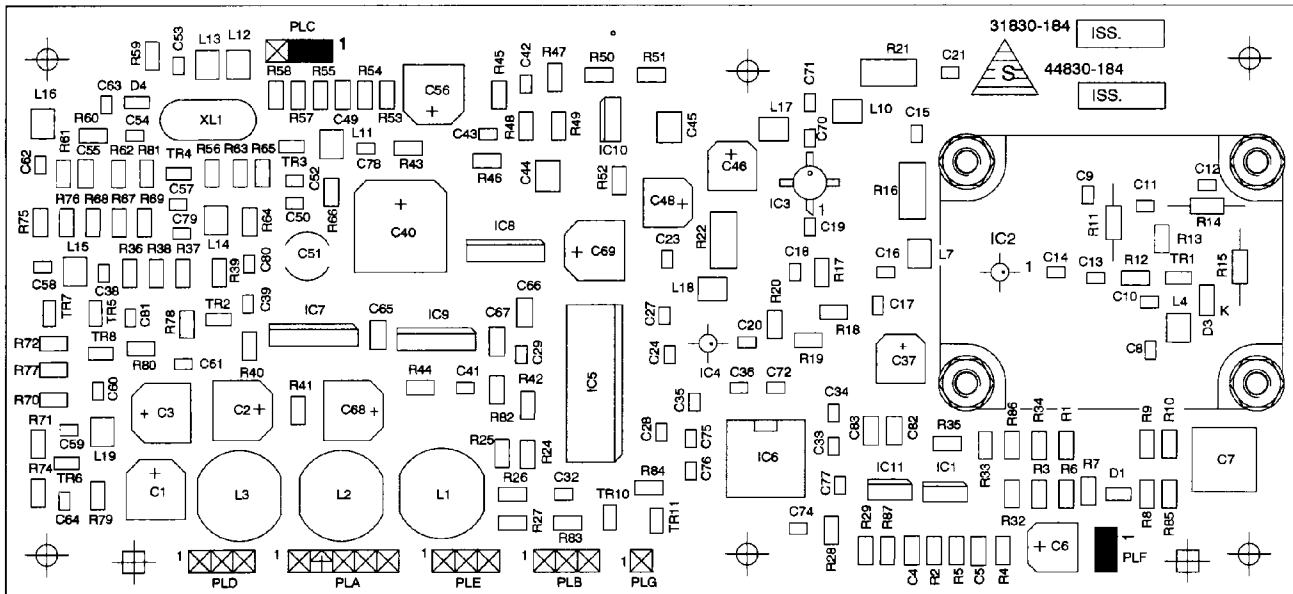
# SERVICING DIAGRAMS

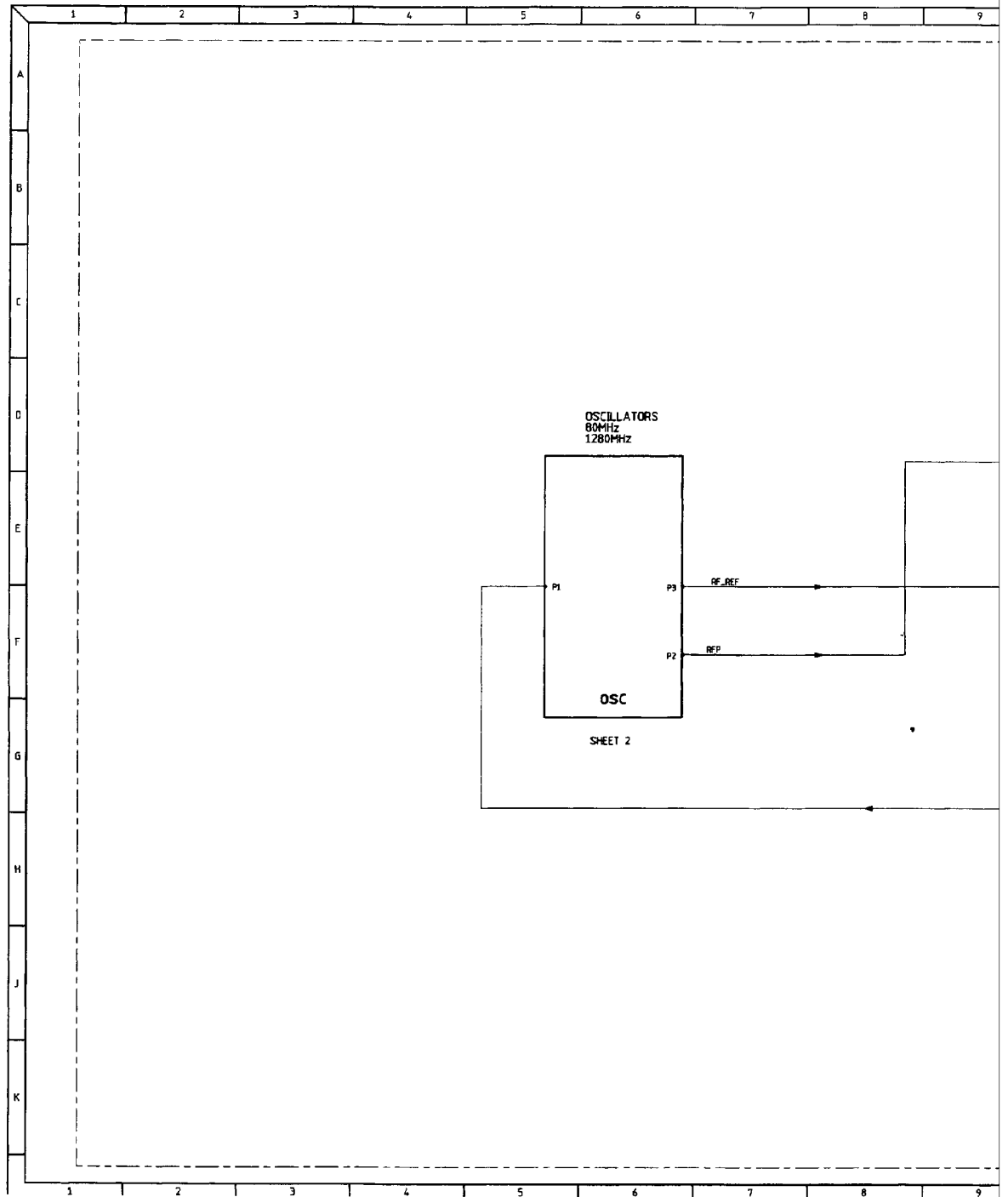


2nd and 3rd LO AE5

Drg. No. 44830/184 Sheet 1 of 1 Issue 5

# Component layout AE5/1







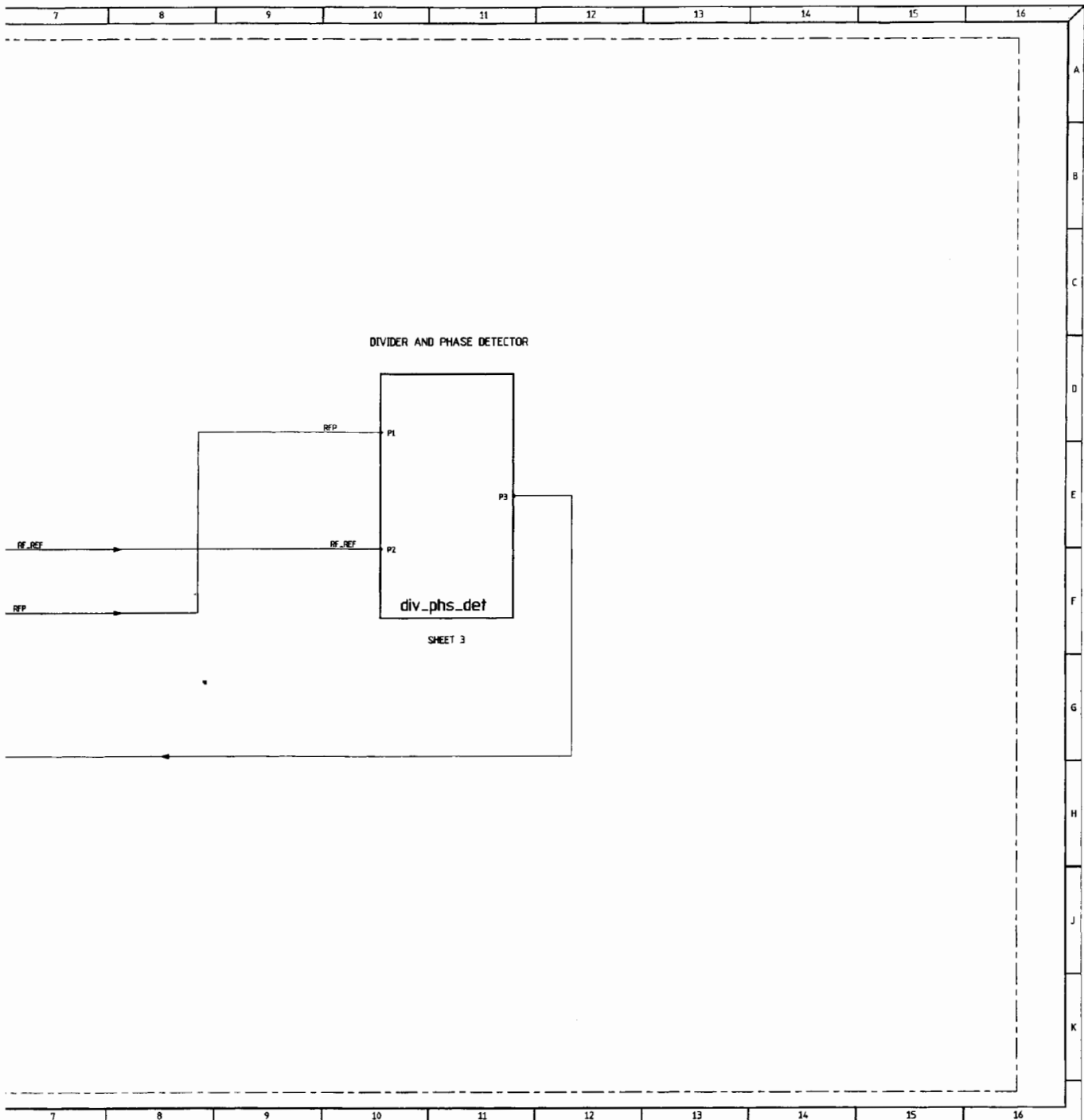
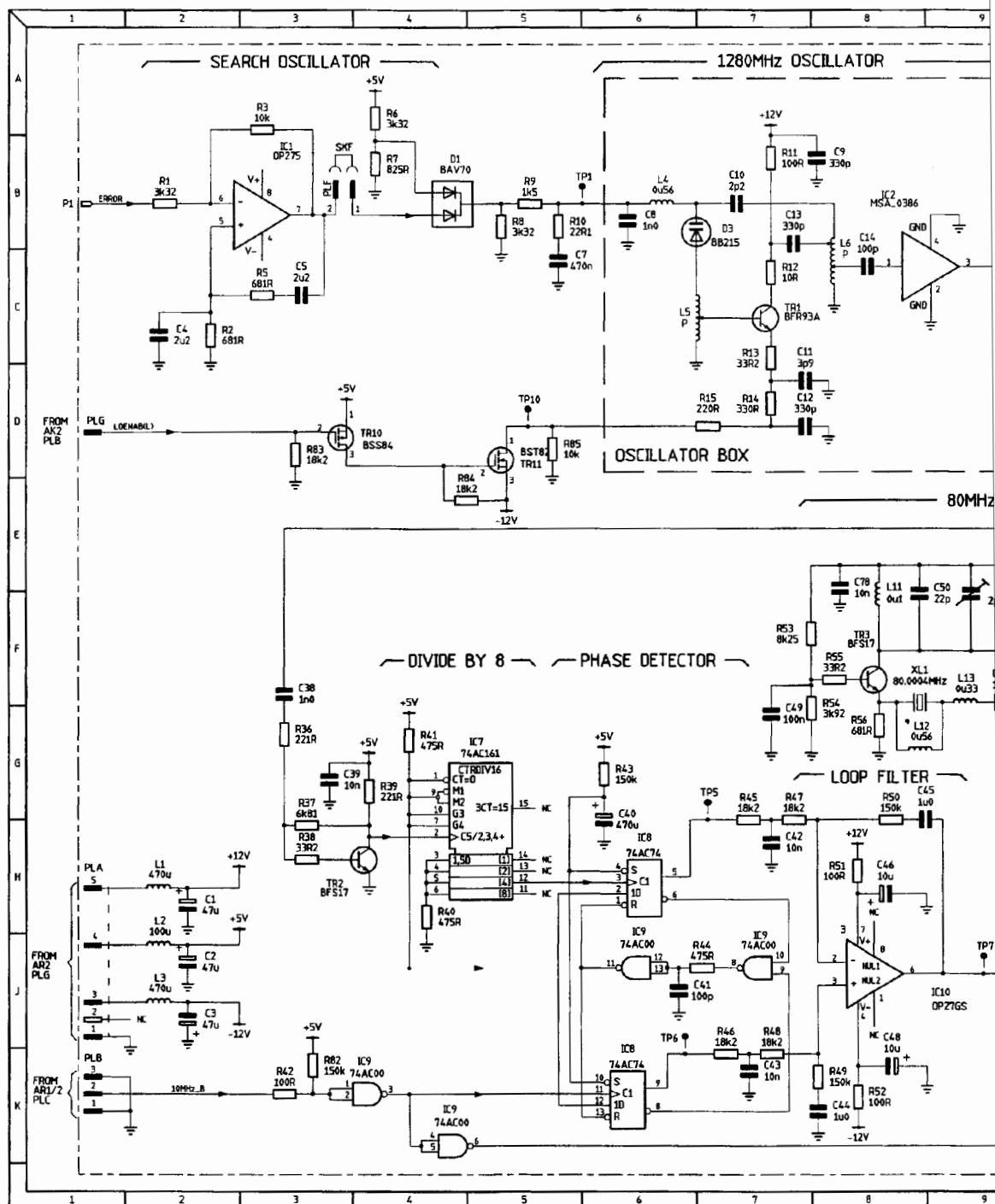
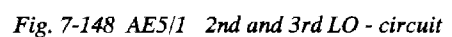
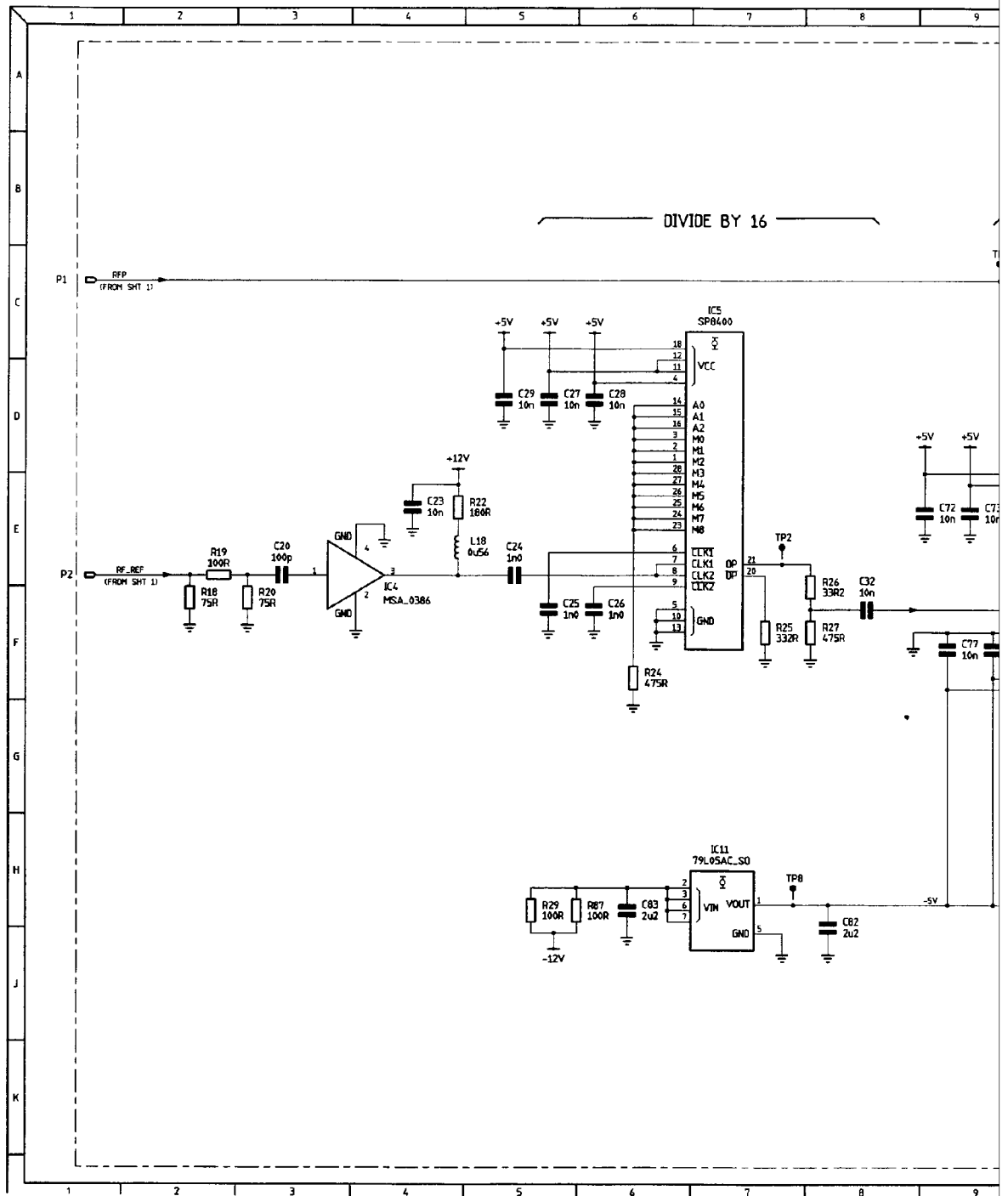
Circuit diagrams **AE5/1**

Fig. 7-147 AE5/1 2nd and 3rd LO - circuit







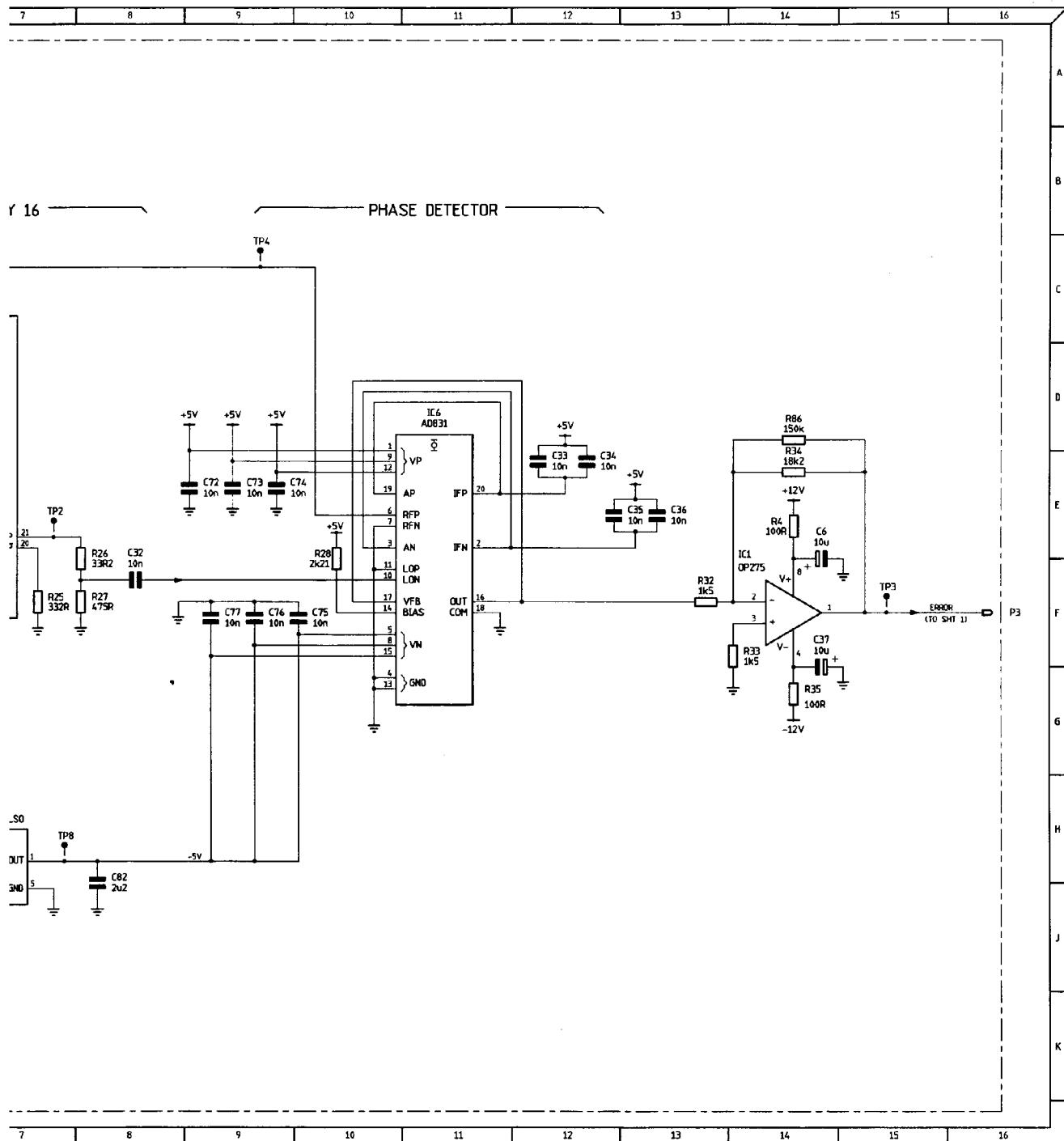
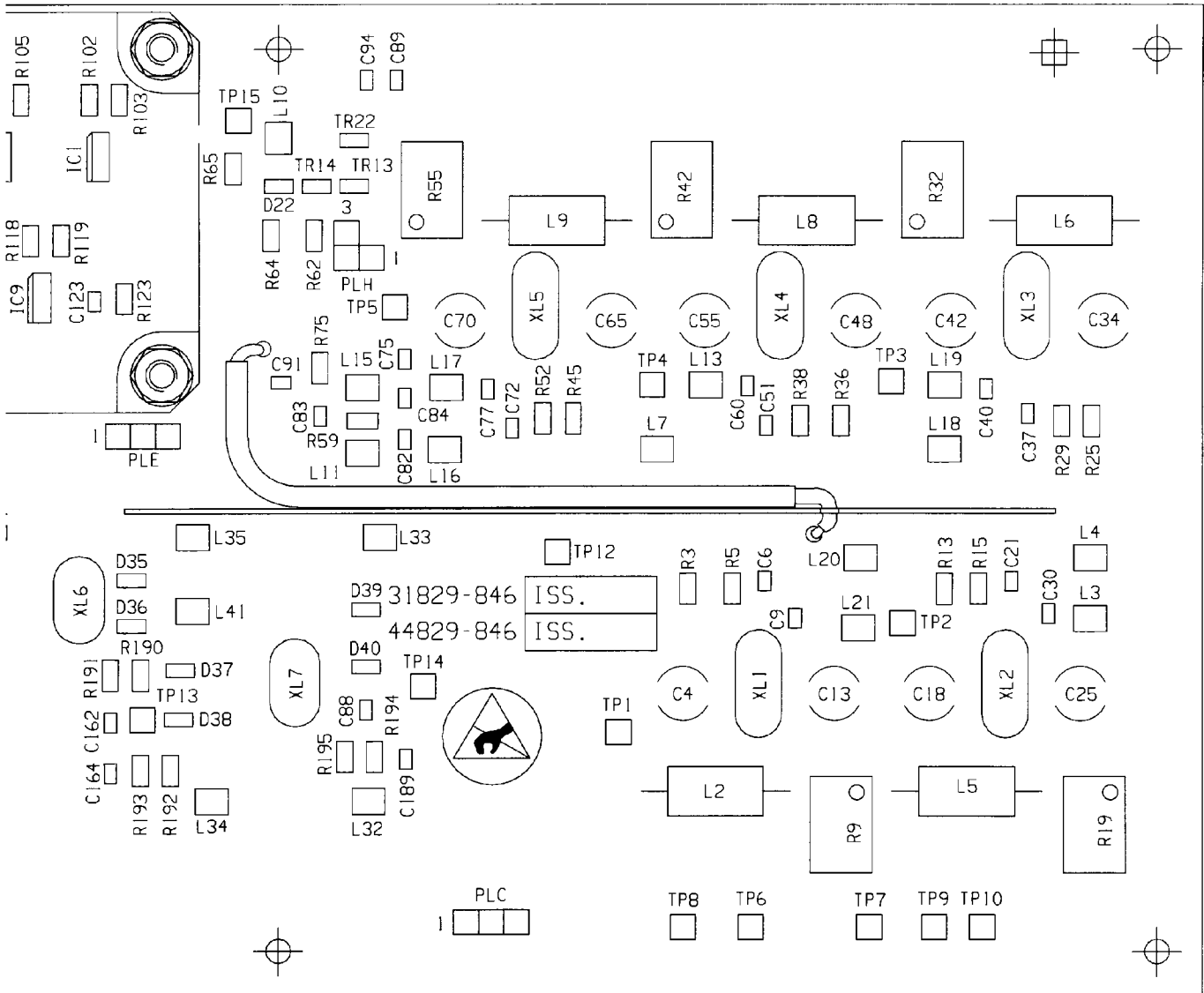
Circuit diagrams **AE5/1**

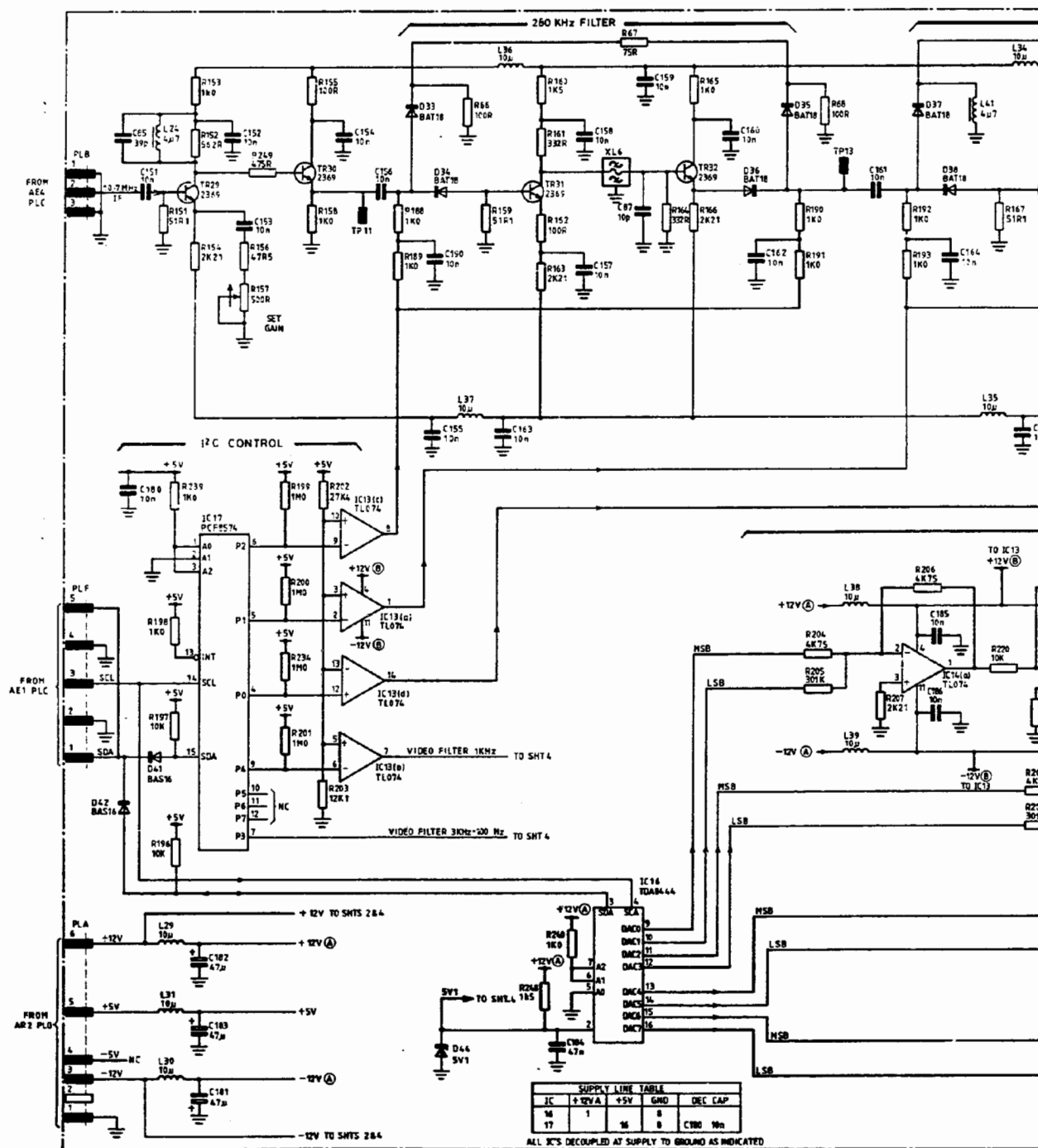
Fig. 7-149 AE5/1 2nd and 3rd LO - circuit

## Drg. No. 44829/846 Sh

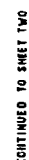


# Component layout **AE6**







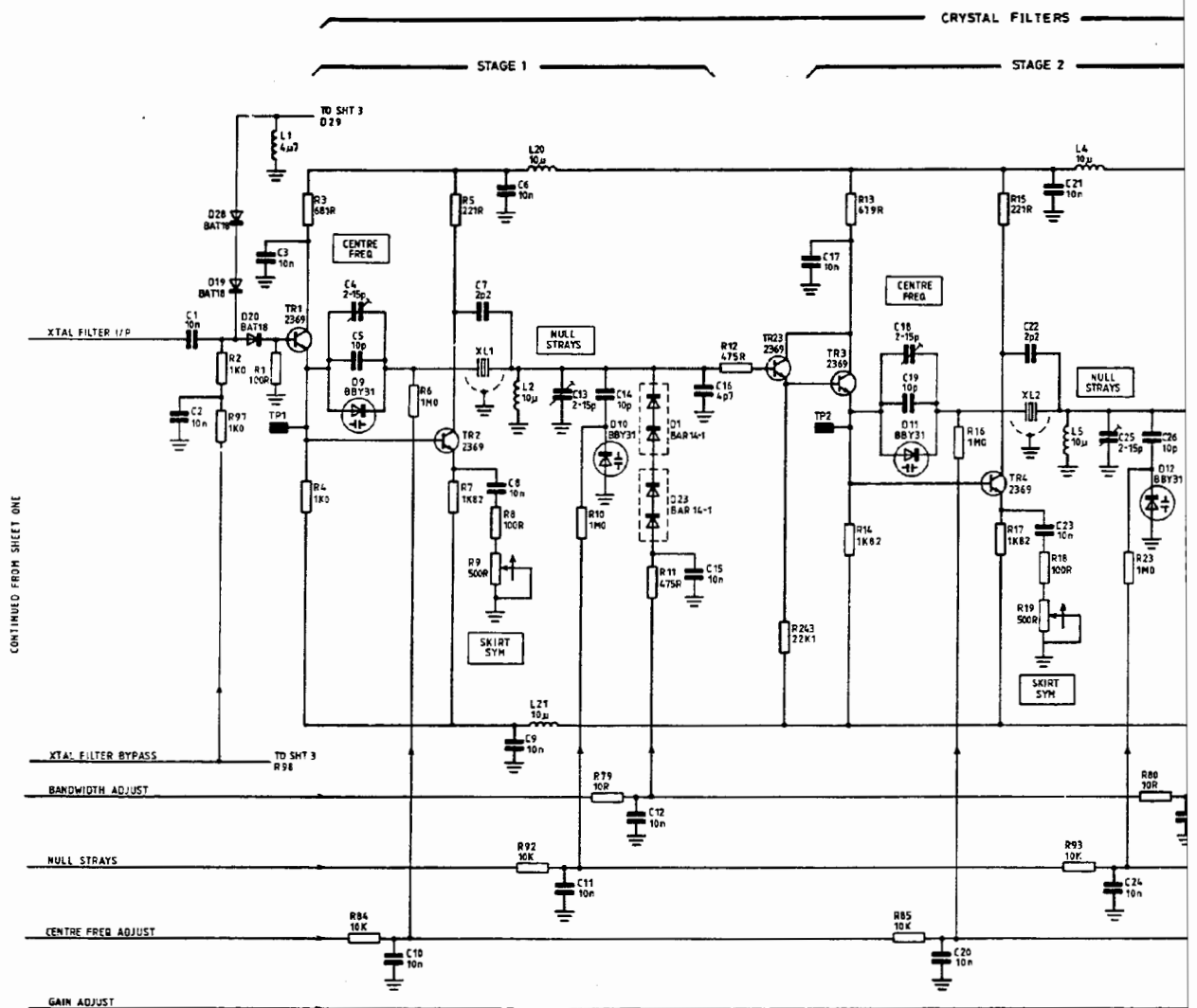


7-237

**Drg. No. 44829/846 SI**

Fig. 7-152 AE6 Spectrum analyzer - component layout, solder side

**46882-168**



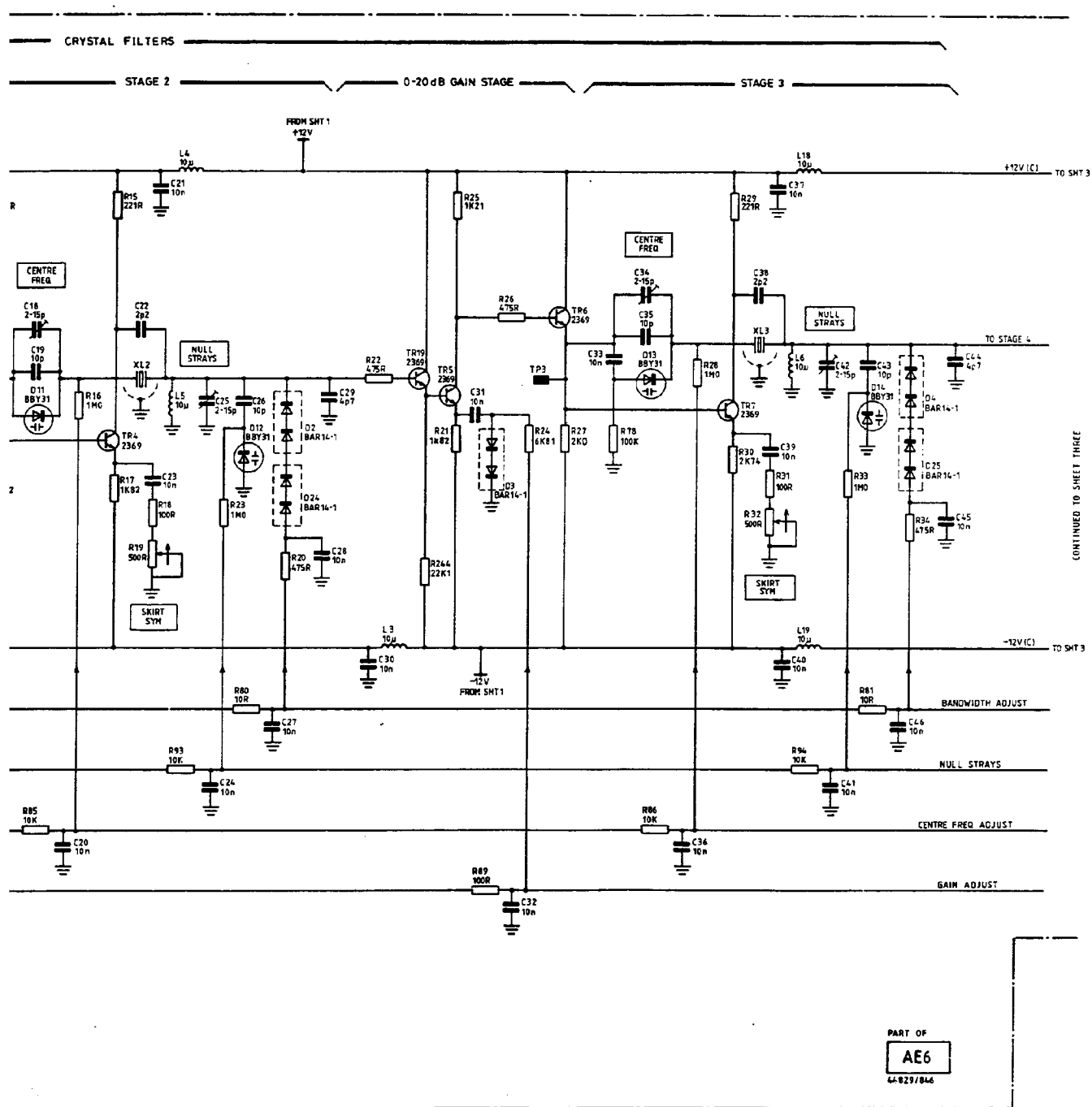
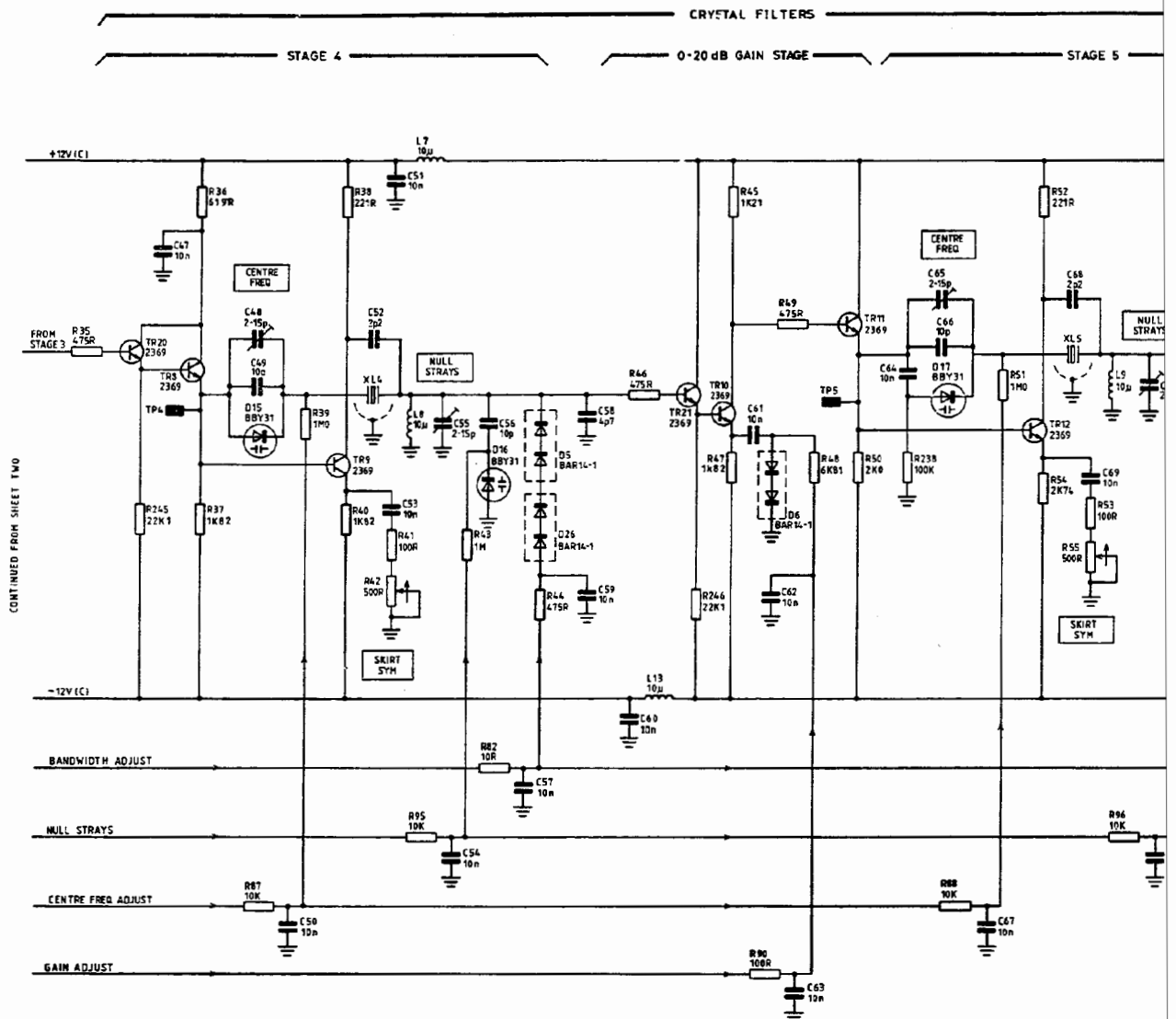
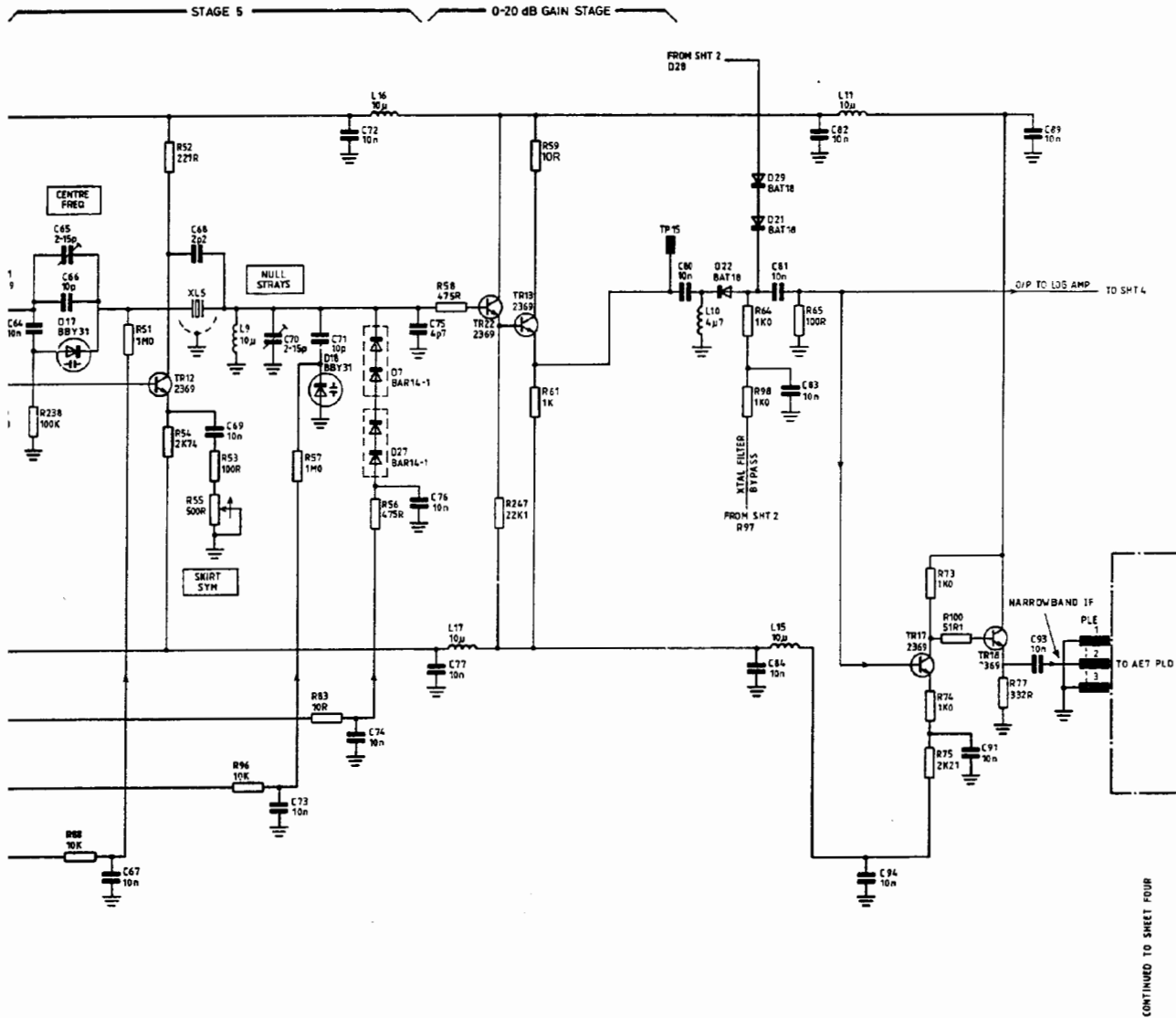
Circuit diagrams **AE6**

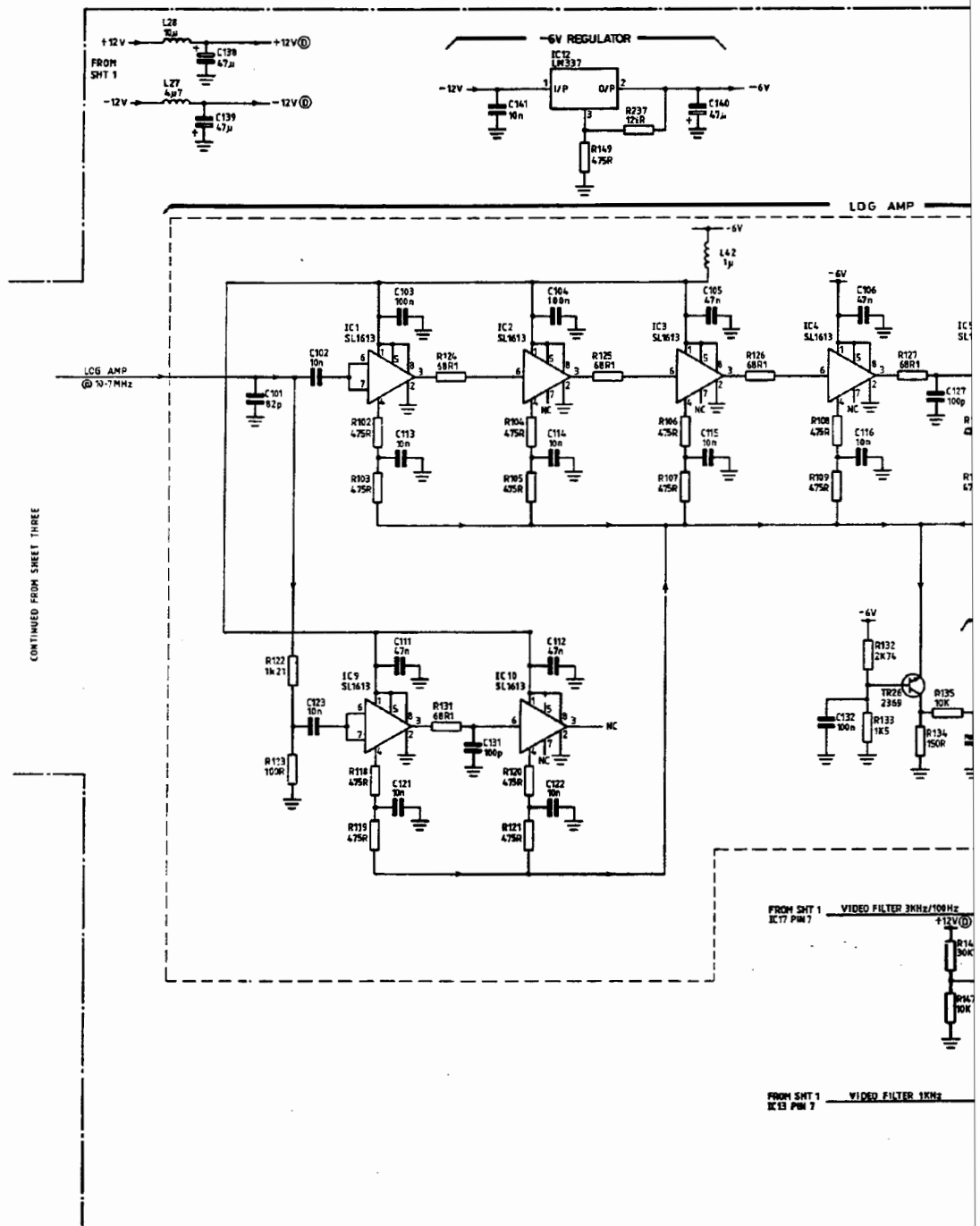
Fig. 7-153 AE6 Crystal filters, stages 1 and 3 - circuit



Circuit diagrams **AE6**

PART OF  
**AE6**  
AA 829/84-6

Fig. 7-154 AE6 Crystal filters, stages 4 and 5 - circuit





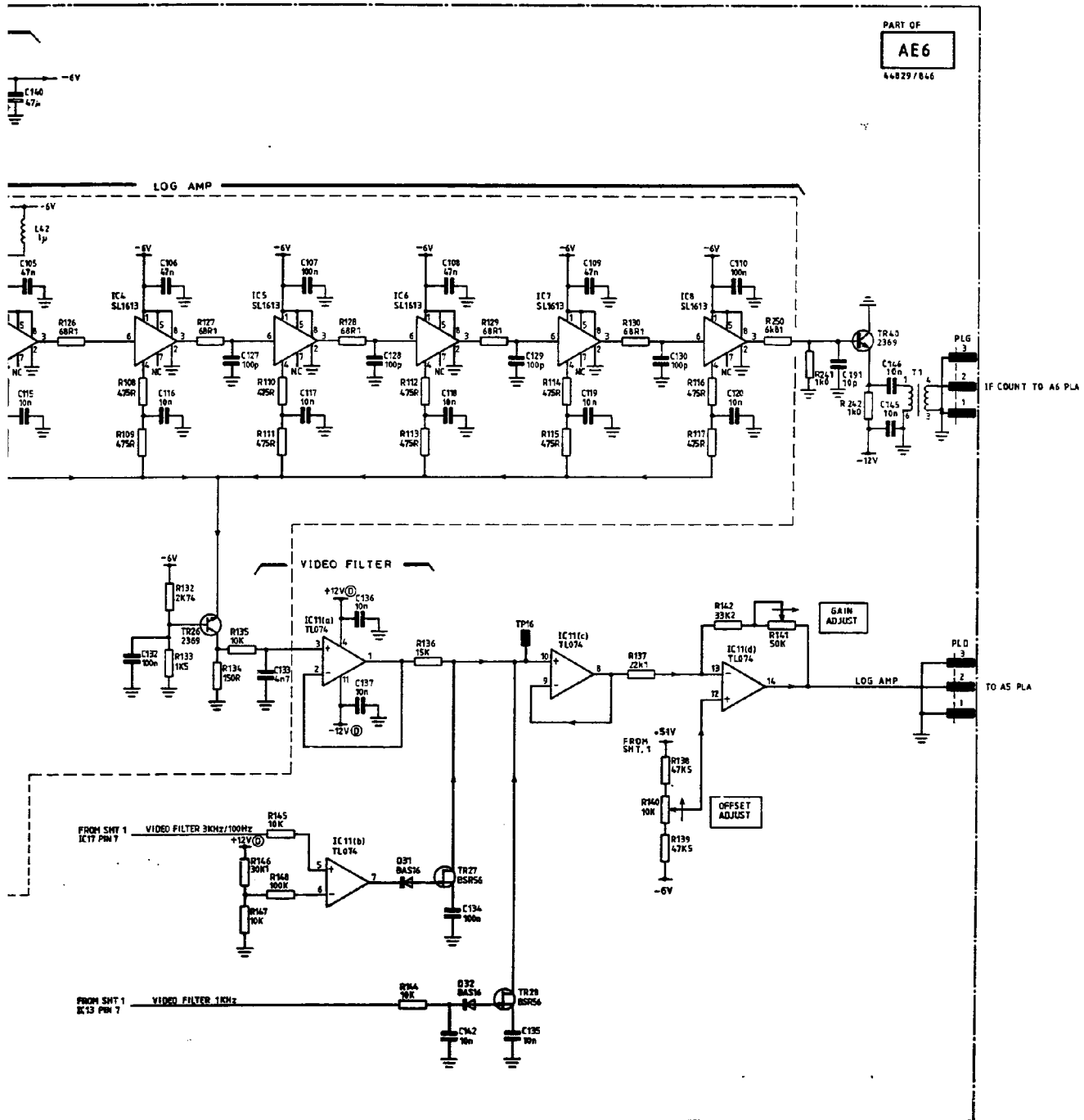
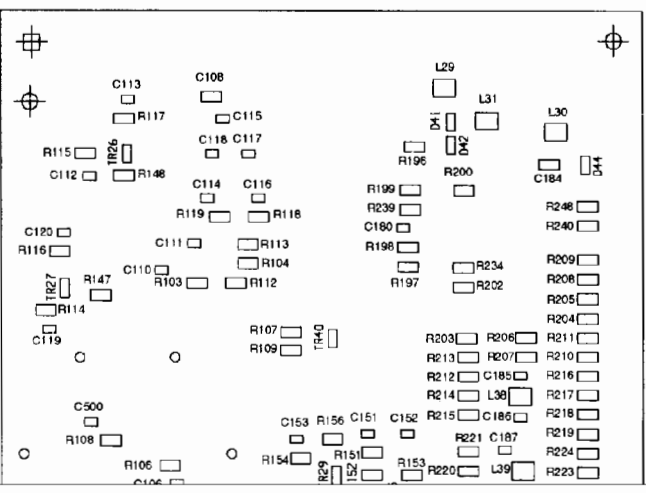
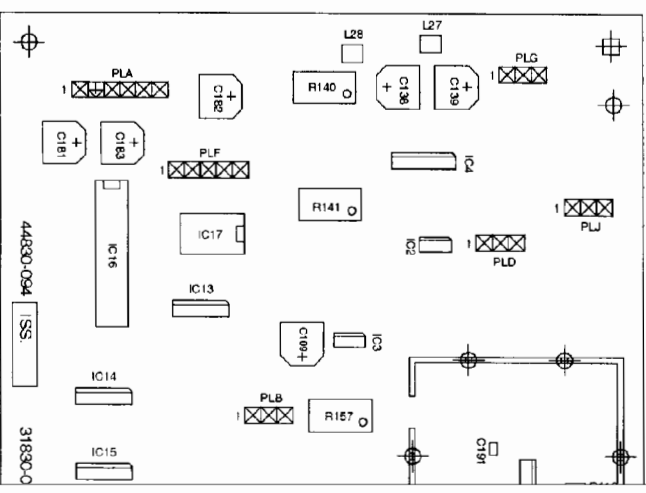
Circuit diagrams **AE6**

Fig. 7-155 AE6 -6V regulator, log amplifier, video filter - circuit

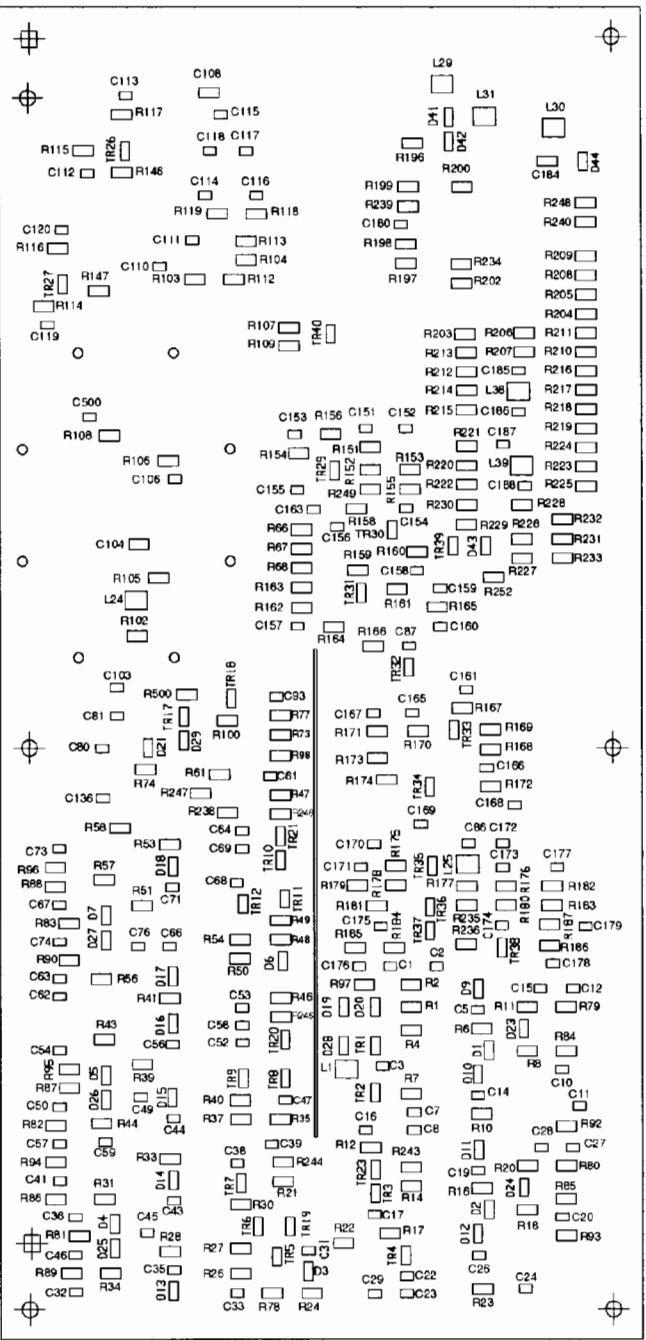
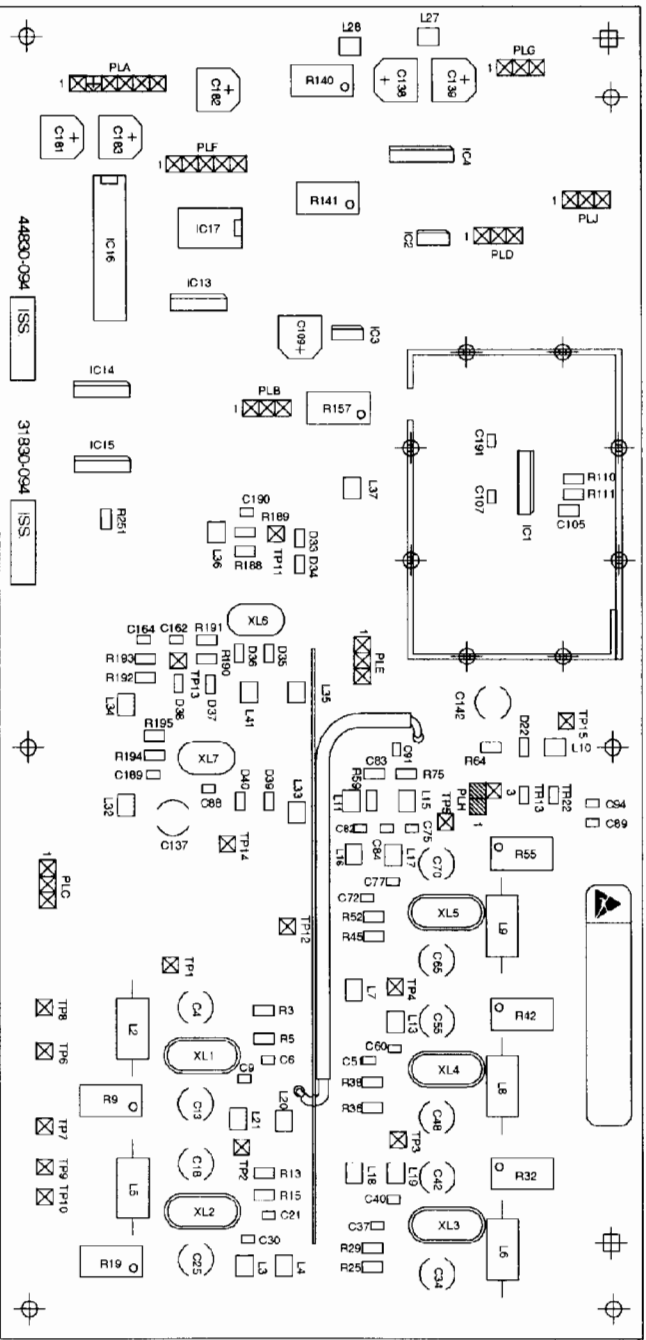
**-6V regulator, log amplifier, video filter AE6**

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# Component layout **A6/2**

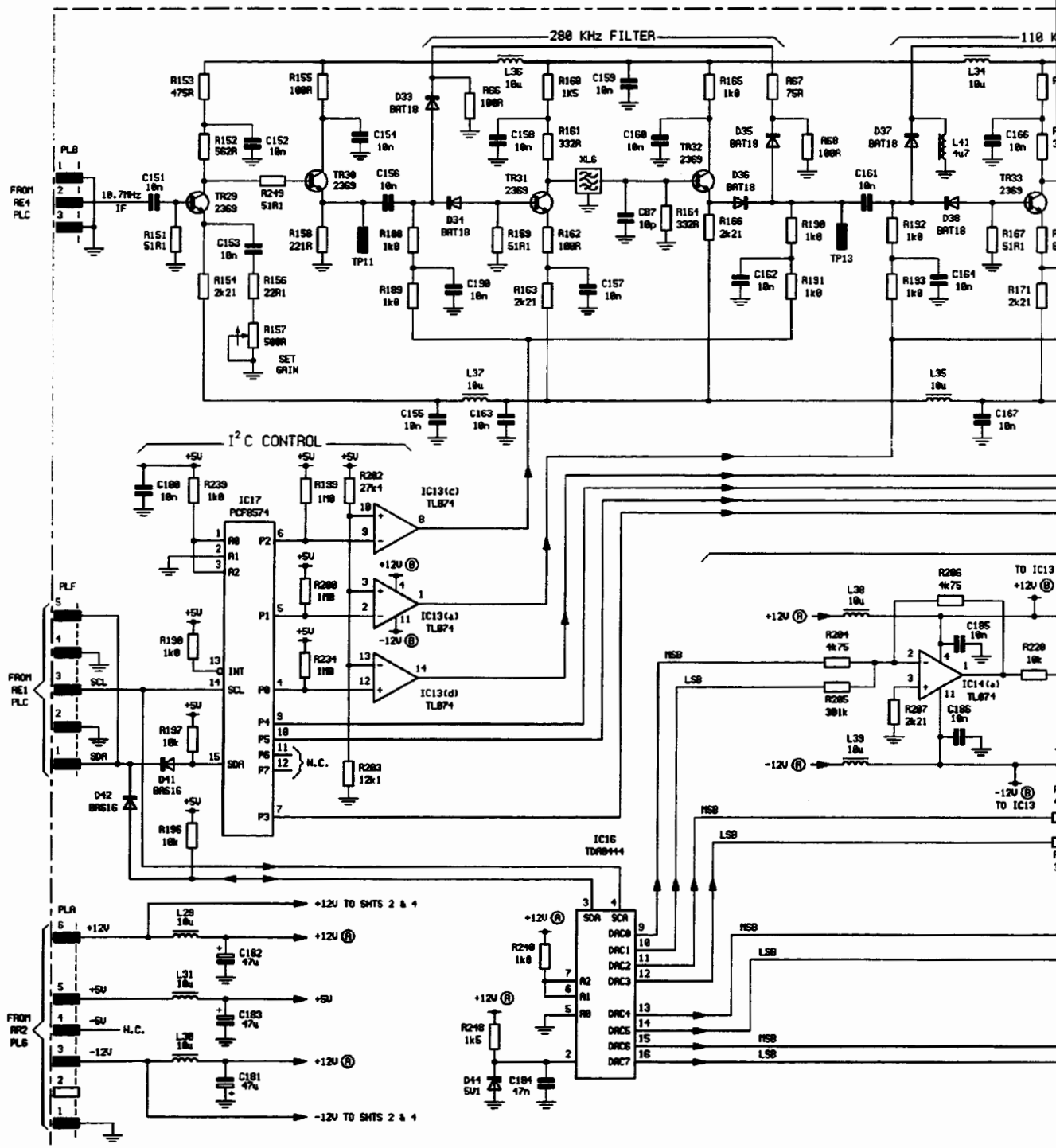


**A6/2**

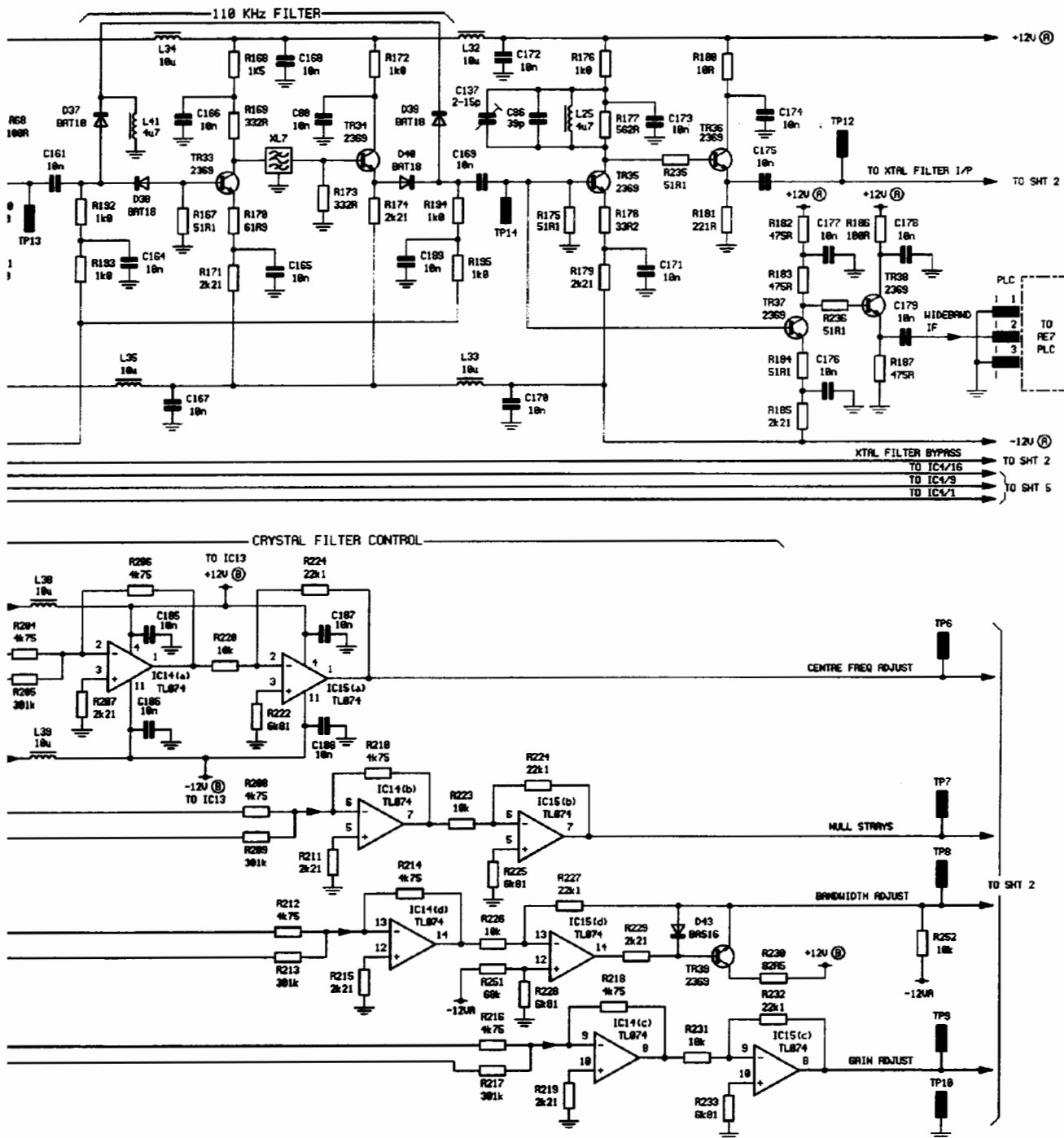
Drq. No. 44830/094 Sheet 1 of 1 Issue 3

Fig. 7-156 A6/2 Spectrum analyzer - component layout

46882-168



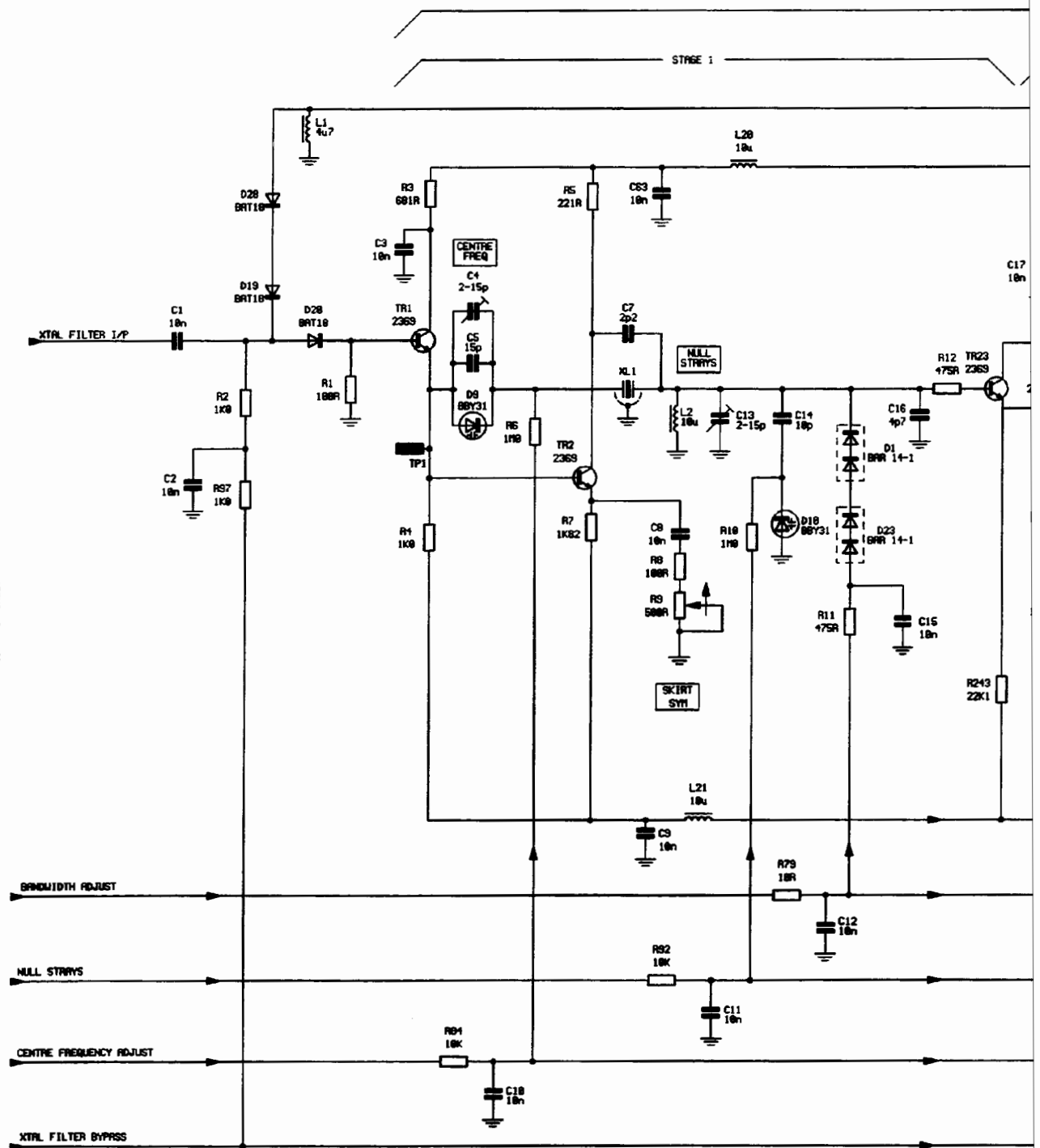
## Circuit diagrams AE6/2



PART OF  
REG/2  
44838-894

Fig. 7-157 AE6/2 IF bandwidth filters - circuit

CONTINUED FROM SHEET ONE



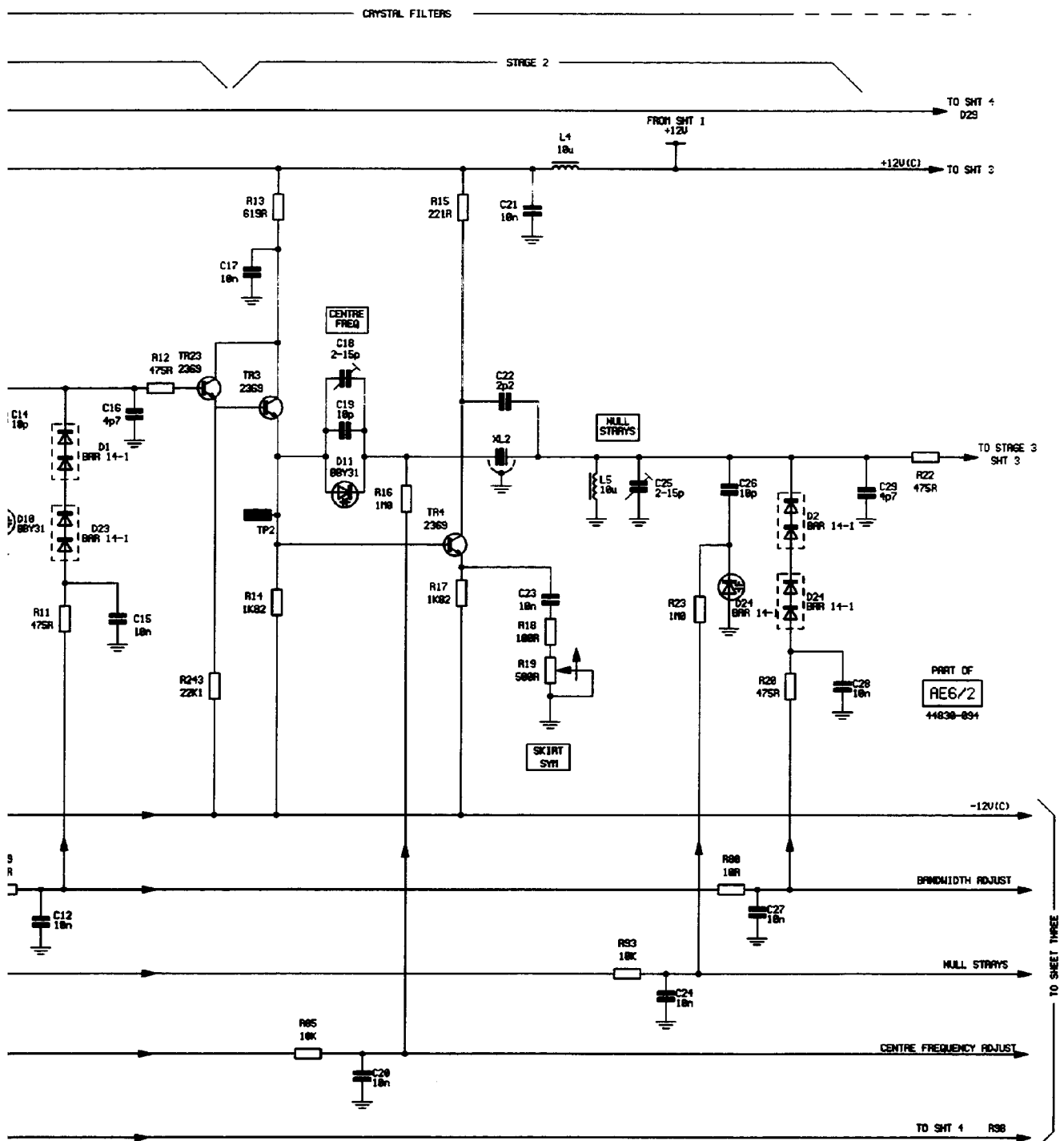
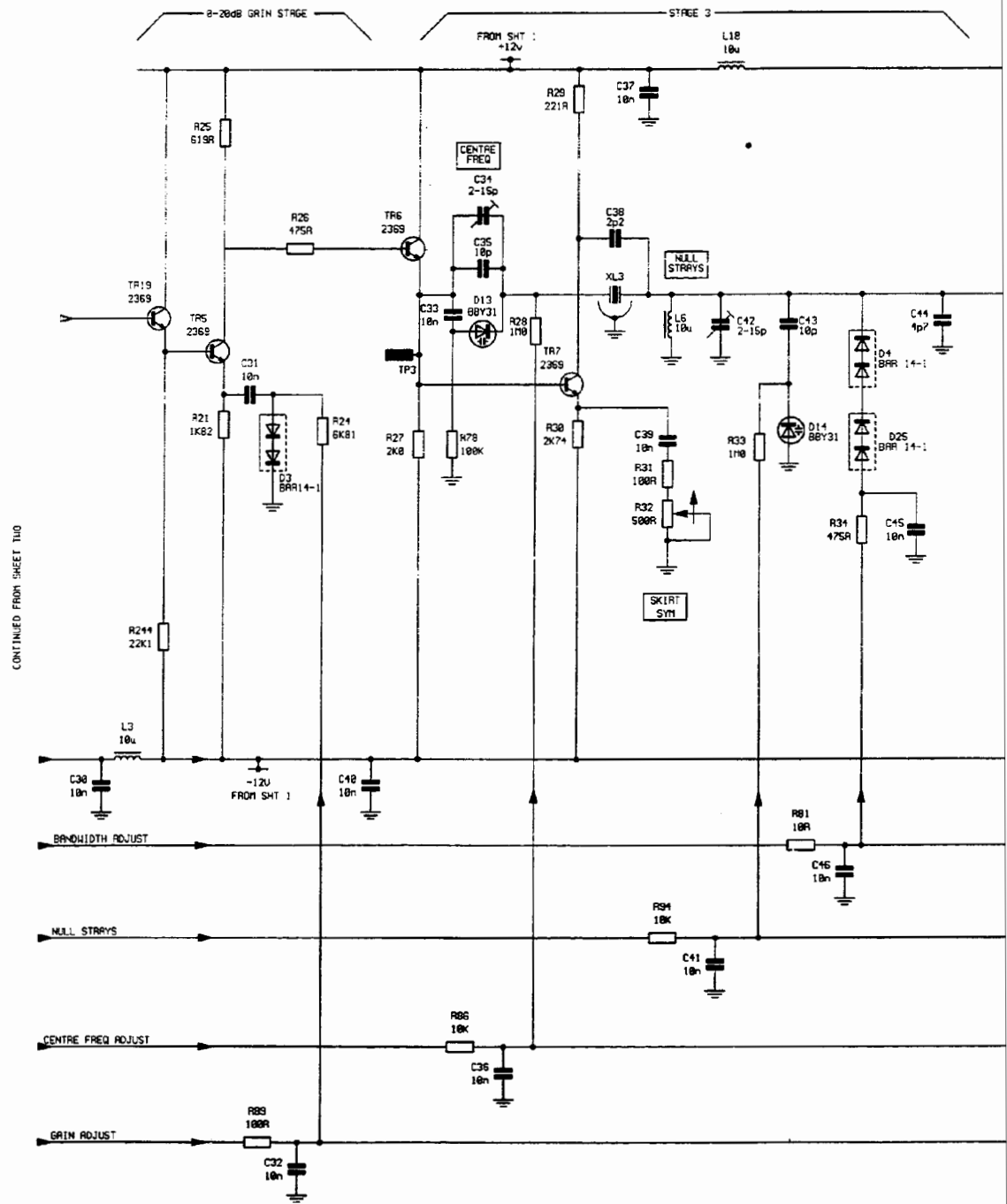
Circuit diagrams **AE6/2**

Fig. 7-158 AE6/2 Crystal filters, stages 1 and 2 - circuit





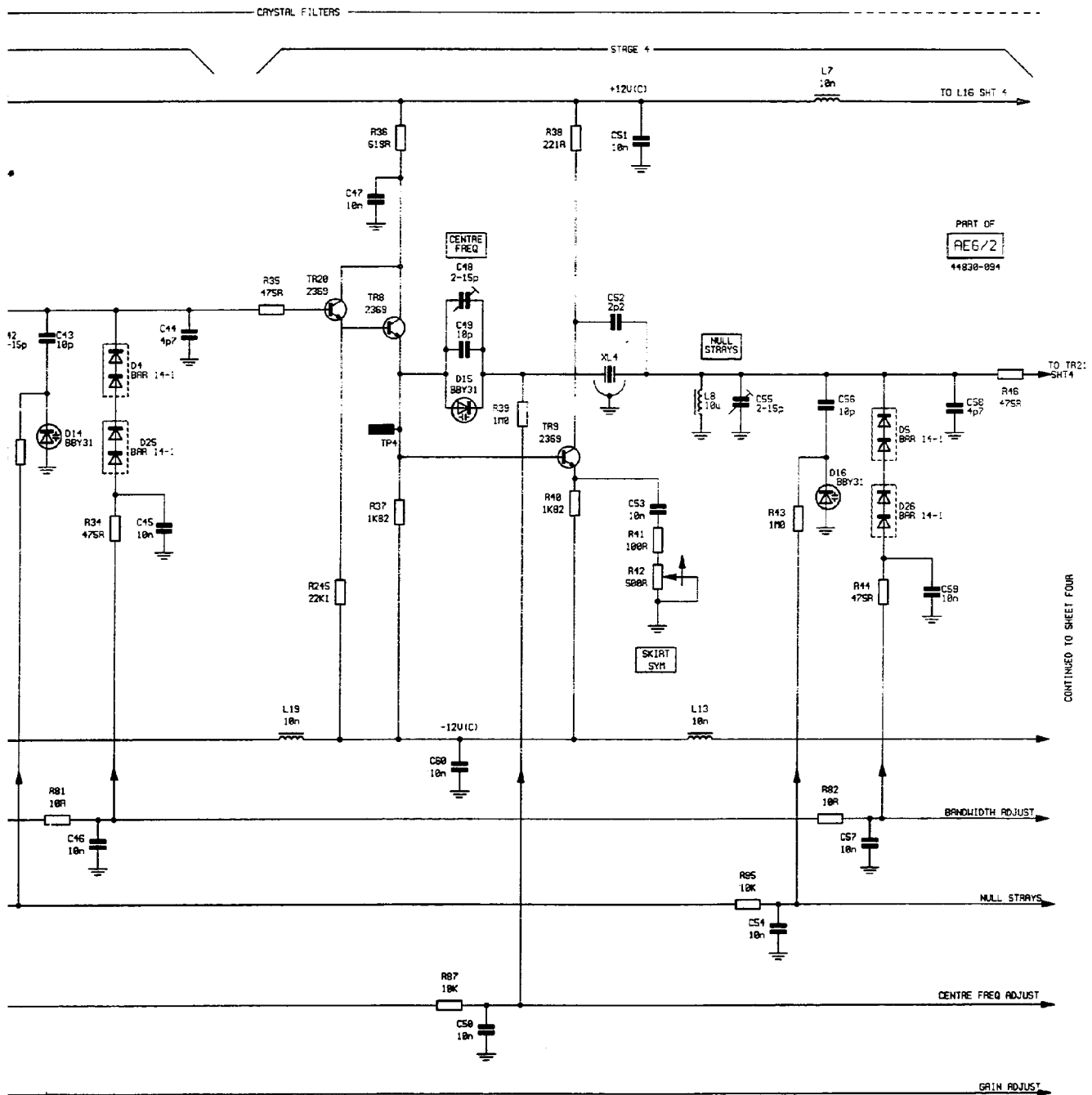
Circuit diagrams **AE6/2**

Fig. 7-159 AE6/2 Crystal filters, stages 3 and 4 - circuit



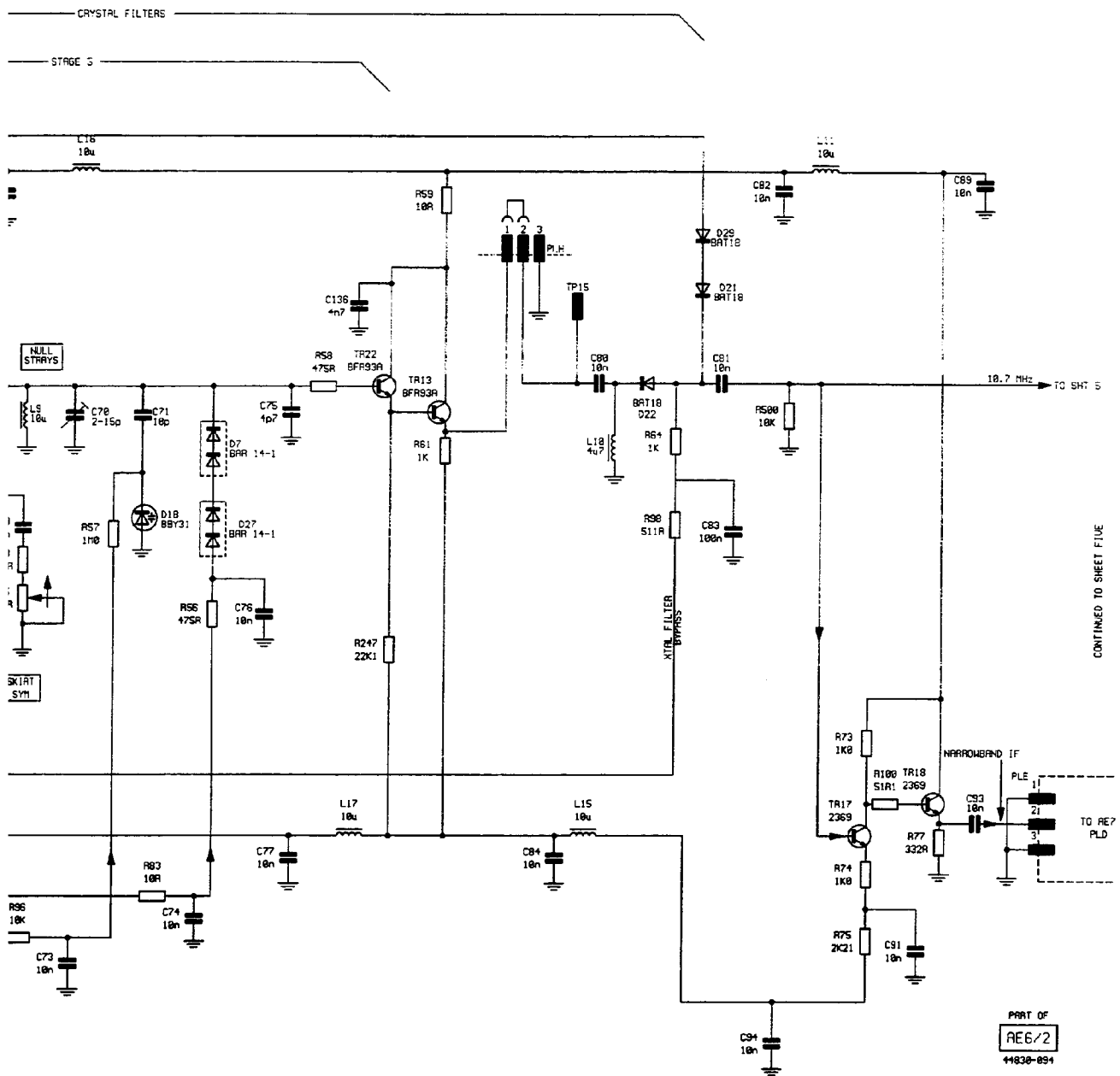
Circuit diagrams **AE6/2**

Fig. 7-160 AE6/2 Crystal filters, stage 5 - circuit



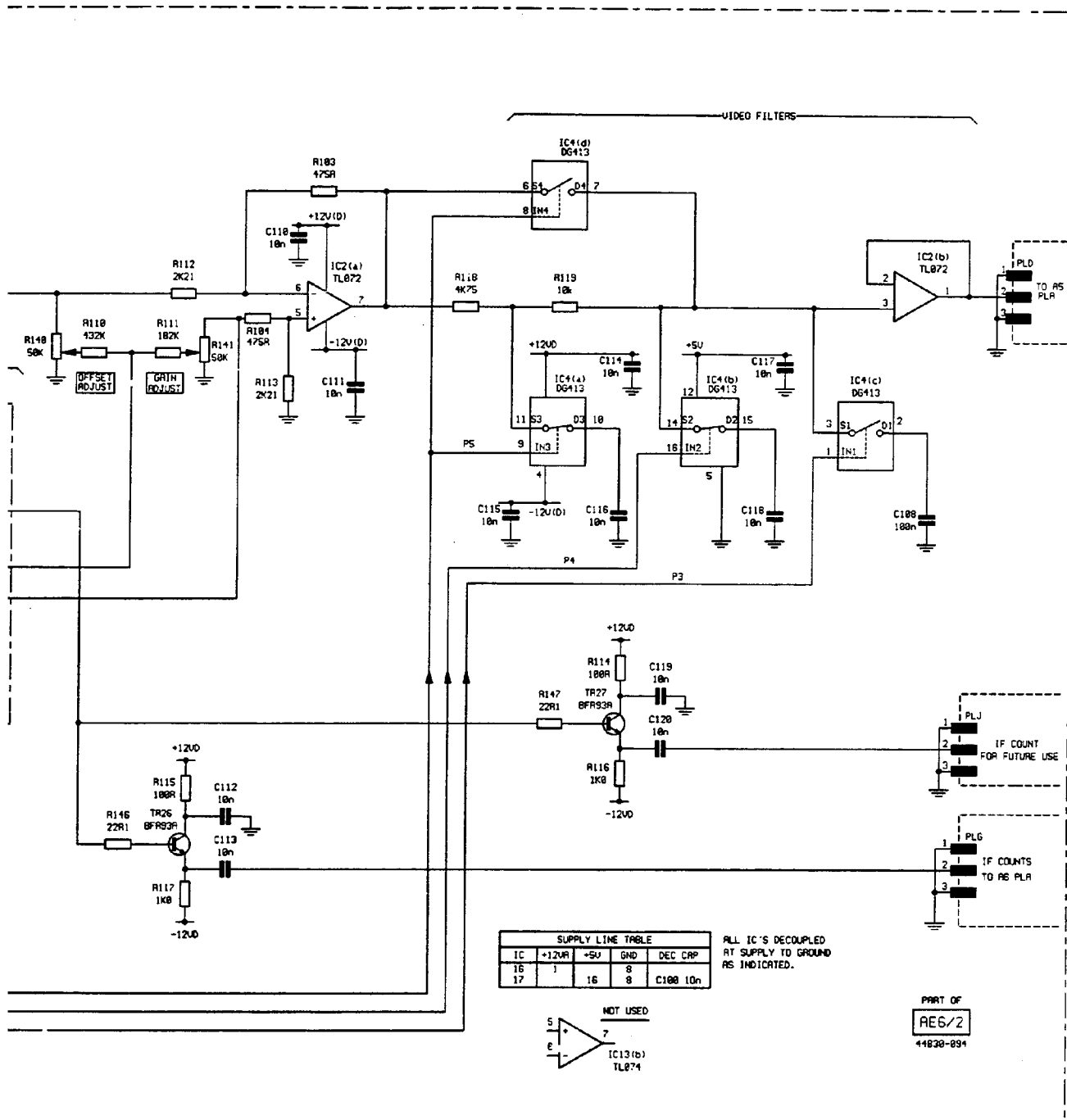
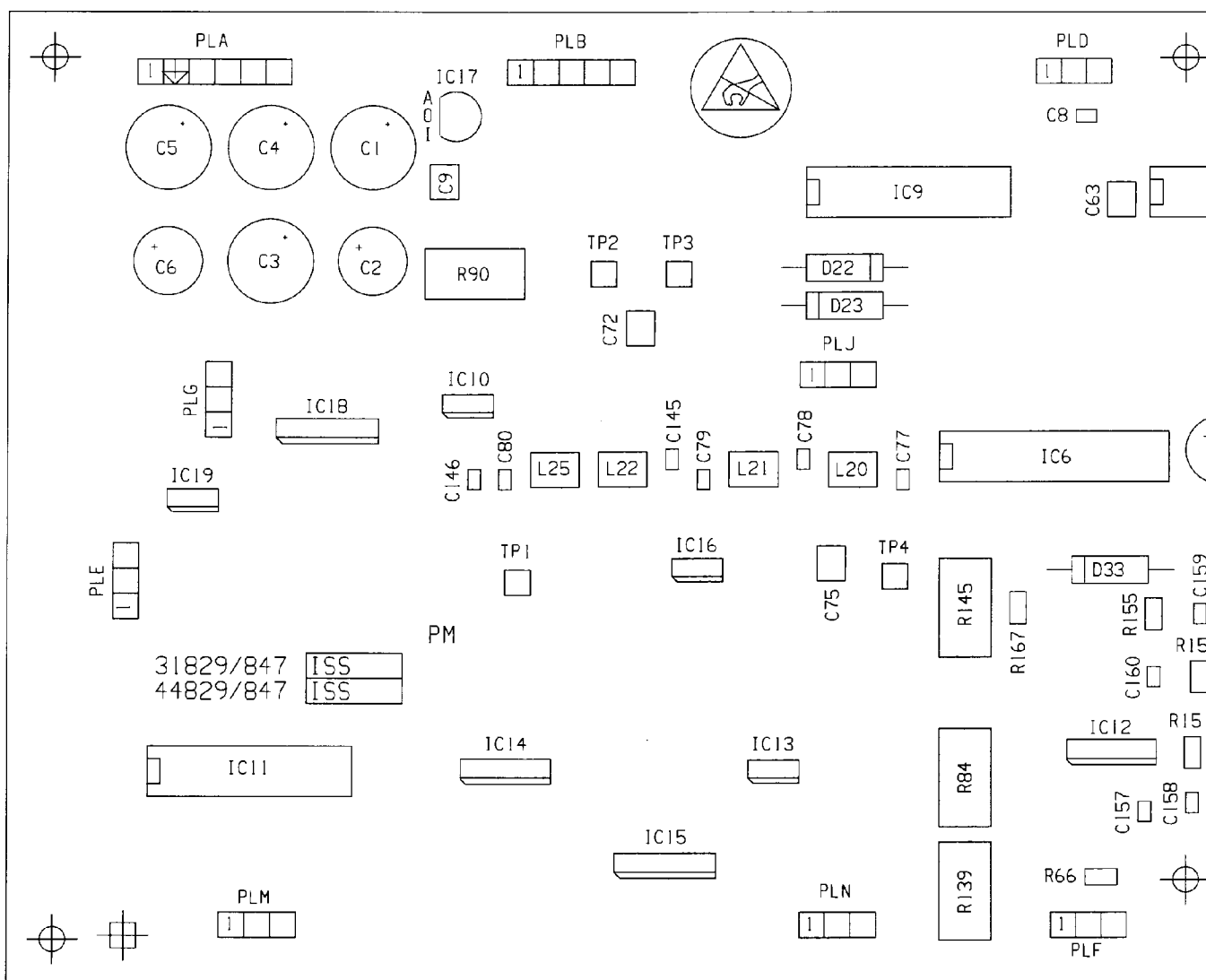
Circuit diagrams **AE6/2**

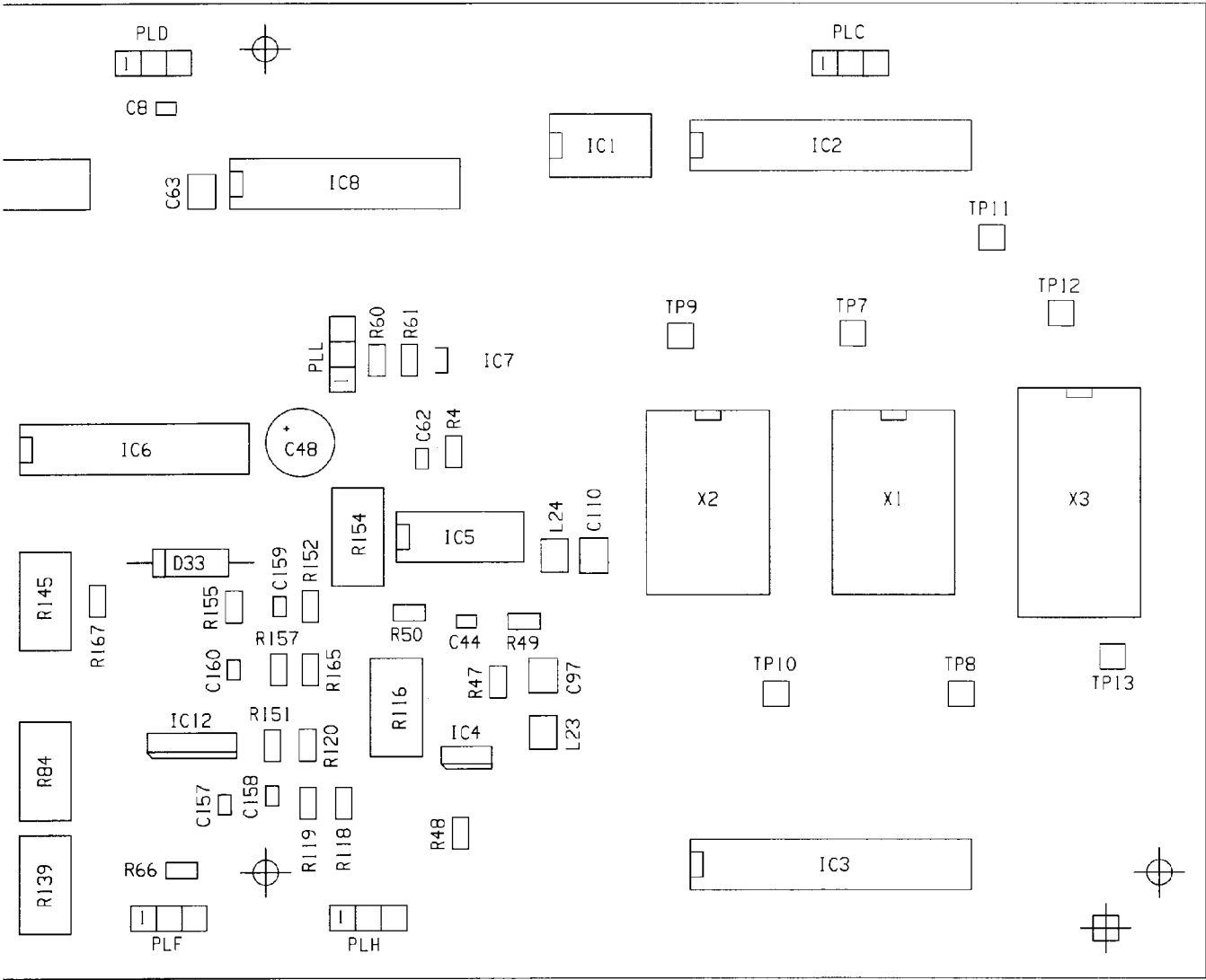
Fig. 7-161 AE6/2 Log amplifier, video filter - circuit

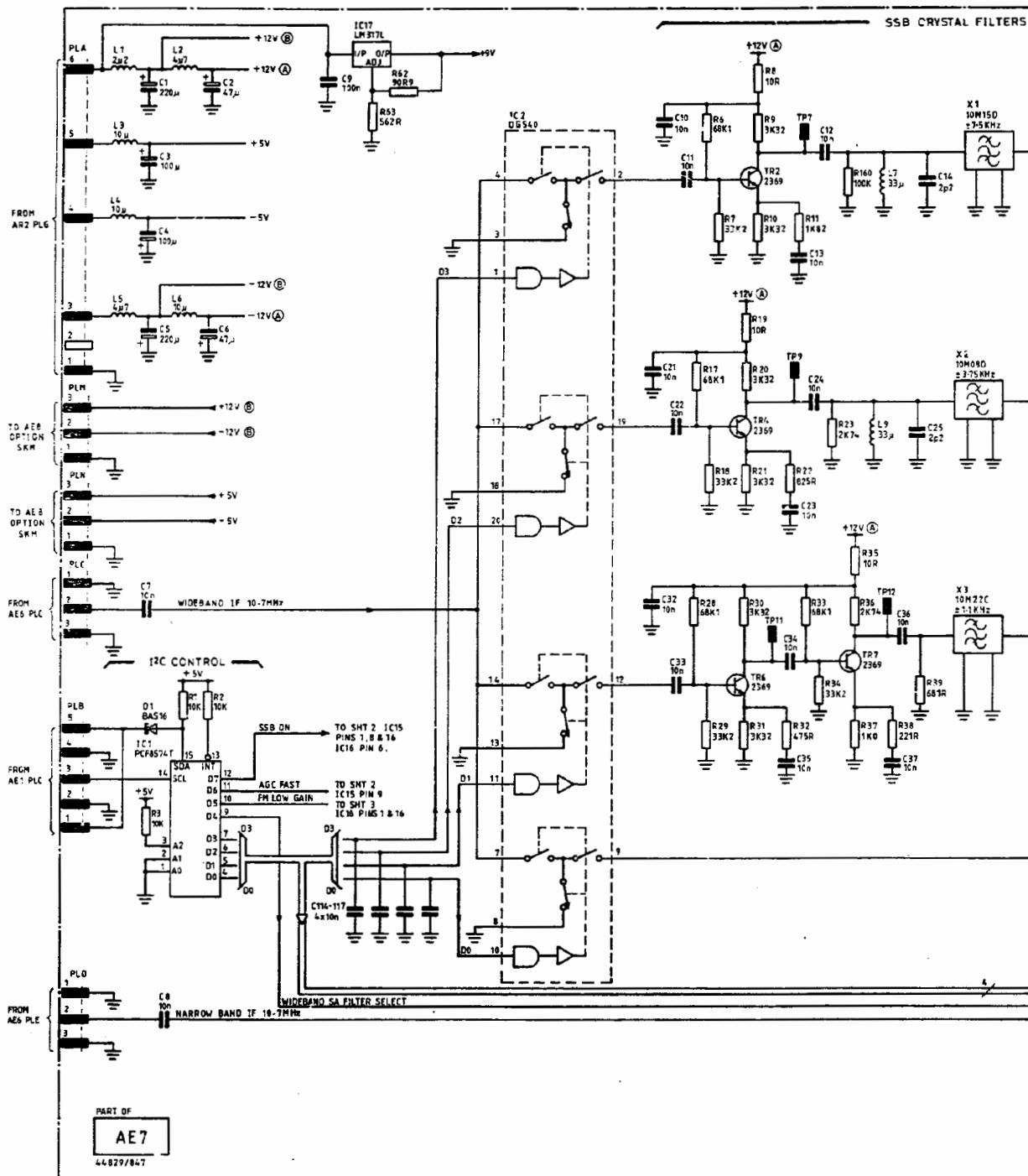


Log amplifier, video filter **AE6/2**

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Component layout **AE7**



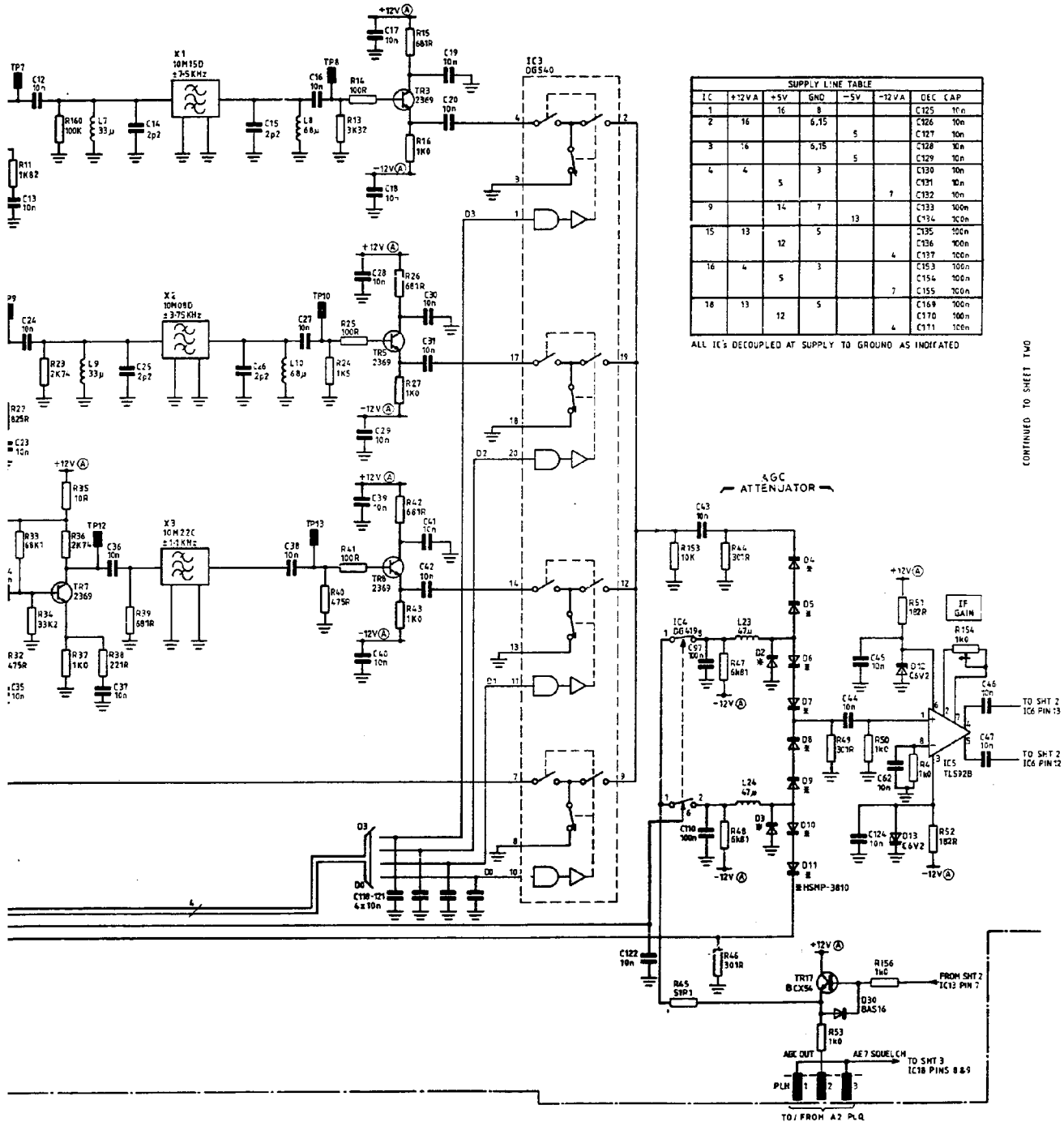




Circuit diagrams **AE7**

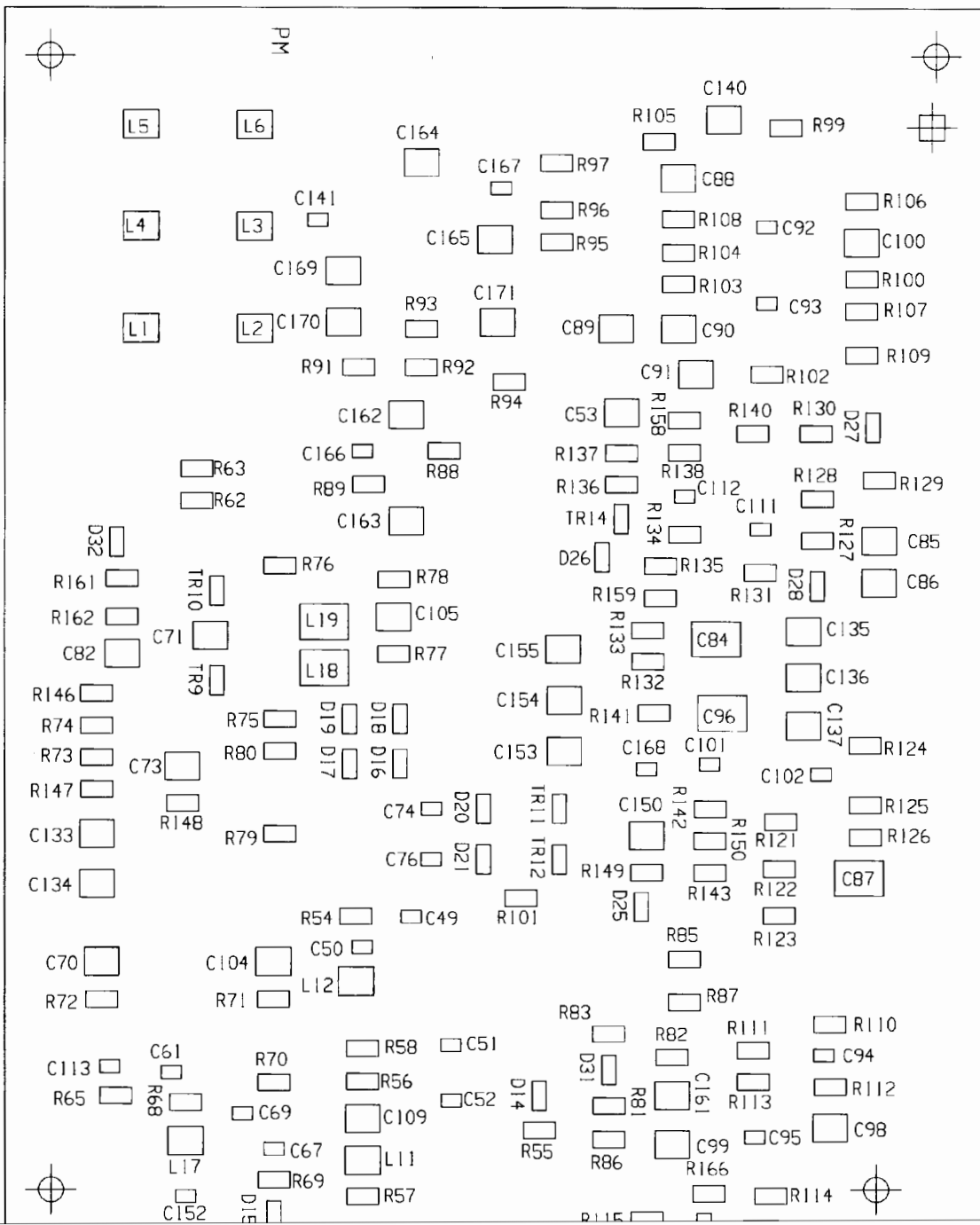
SSB CRYSTAL FILTERS

+ SELECT FOR CRYSTAL



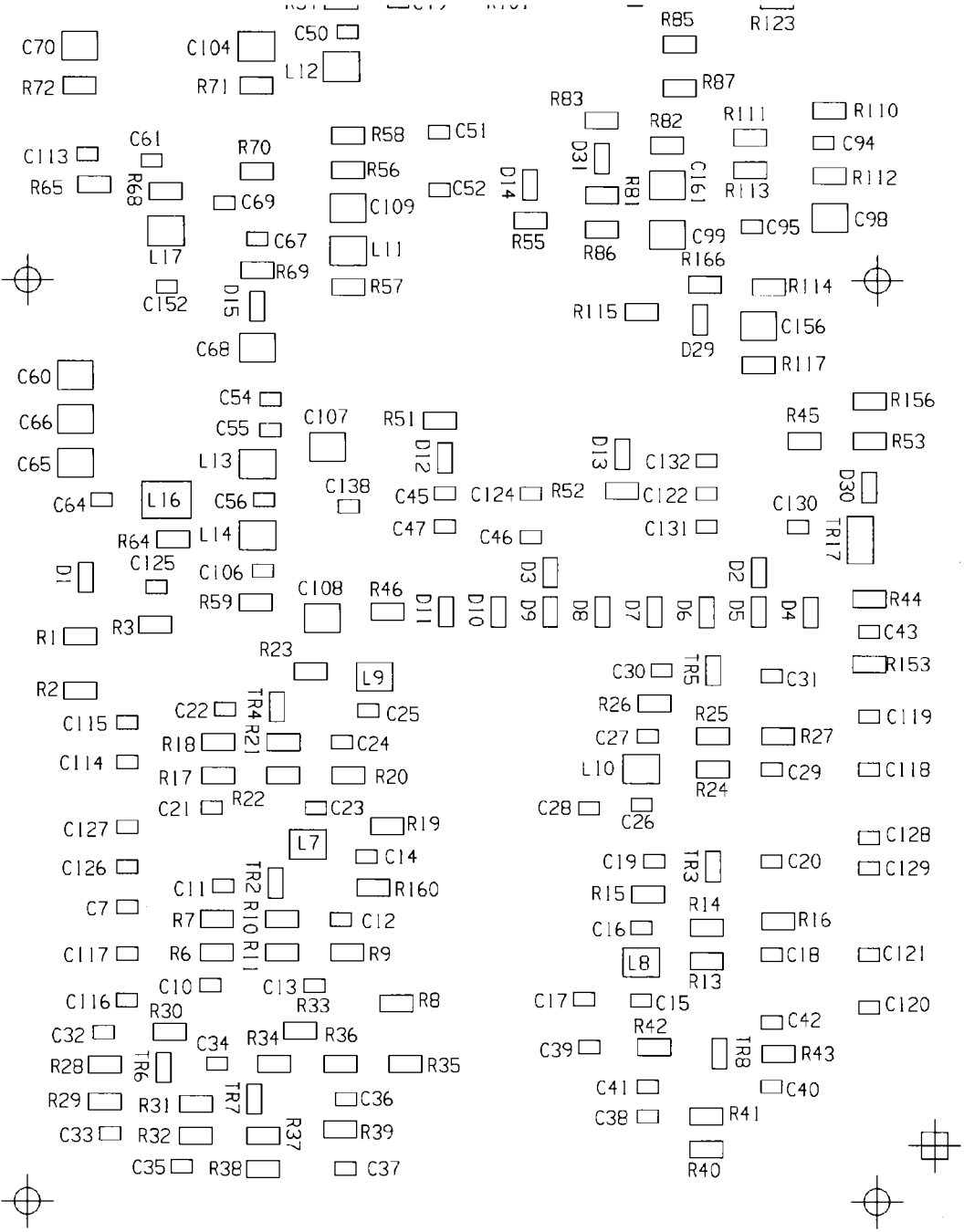
CONTINUED TO SHEET TWO

Fig. 7-163 AE7 SSB crystal filters, AGC attenuator - circuit

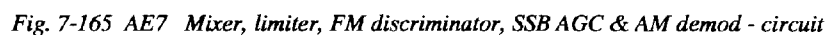


SSB crystal filters, AGC attenuator AE7

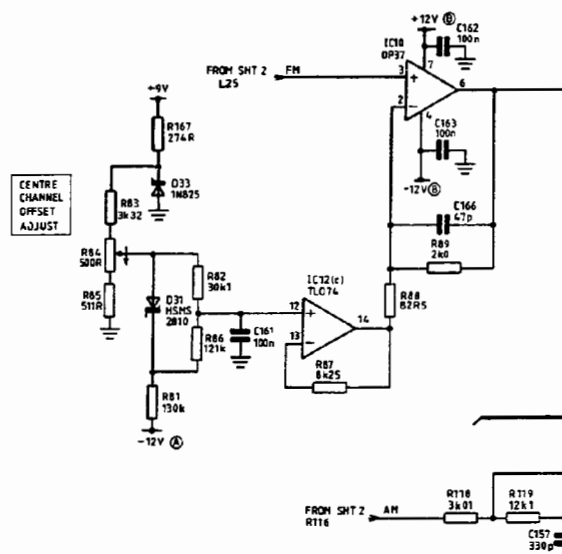
Dr. No. 44829/847 S







FM OFFSET CORRECTION



CONTINUED FROM SHEET TWO

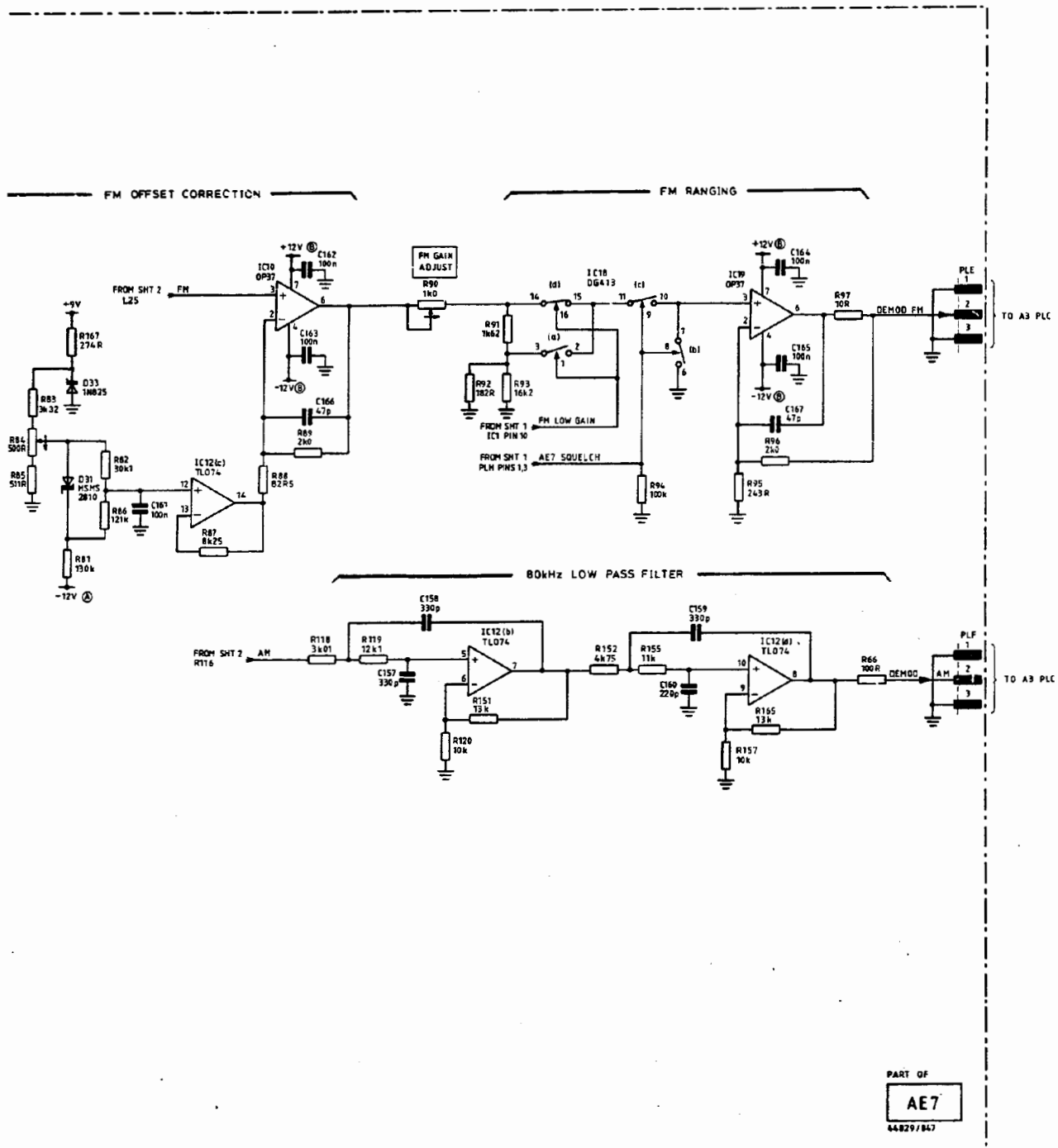
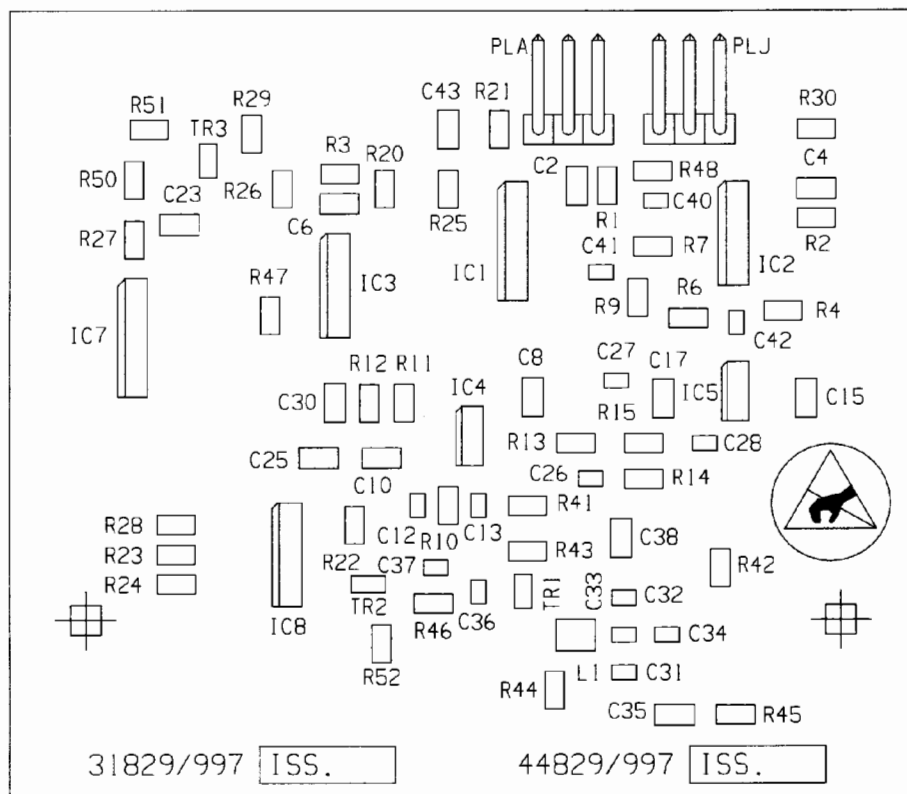
Circuit diagrams **AE7**

Fig. 7-166 AE7 FM offset correction and ranging, 80 kHz LP filter - circuit

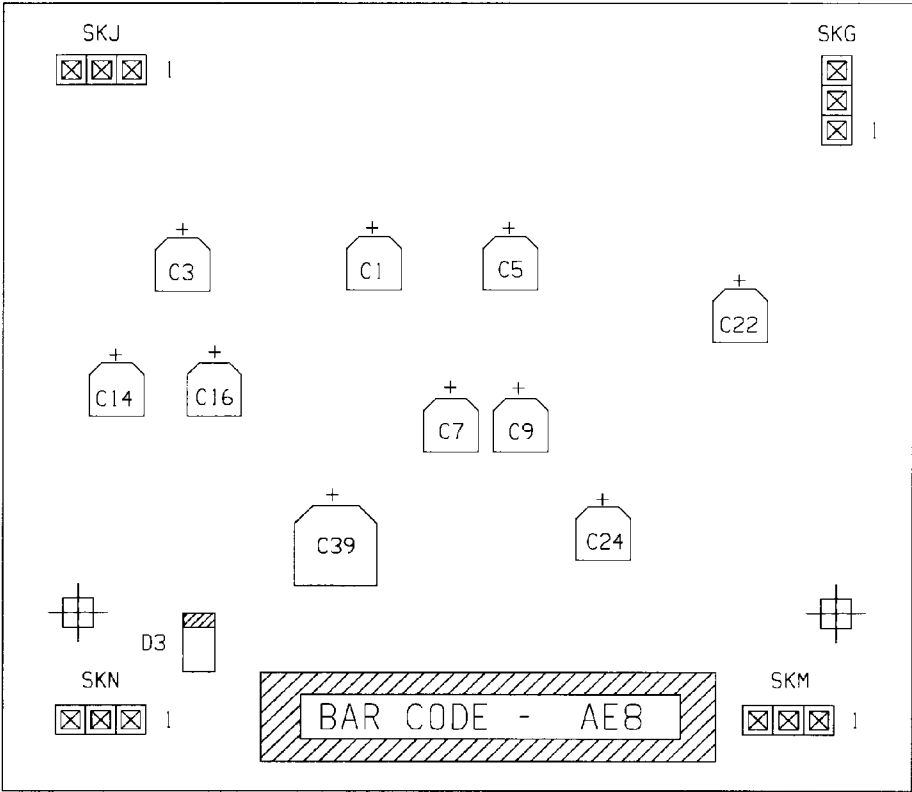


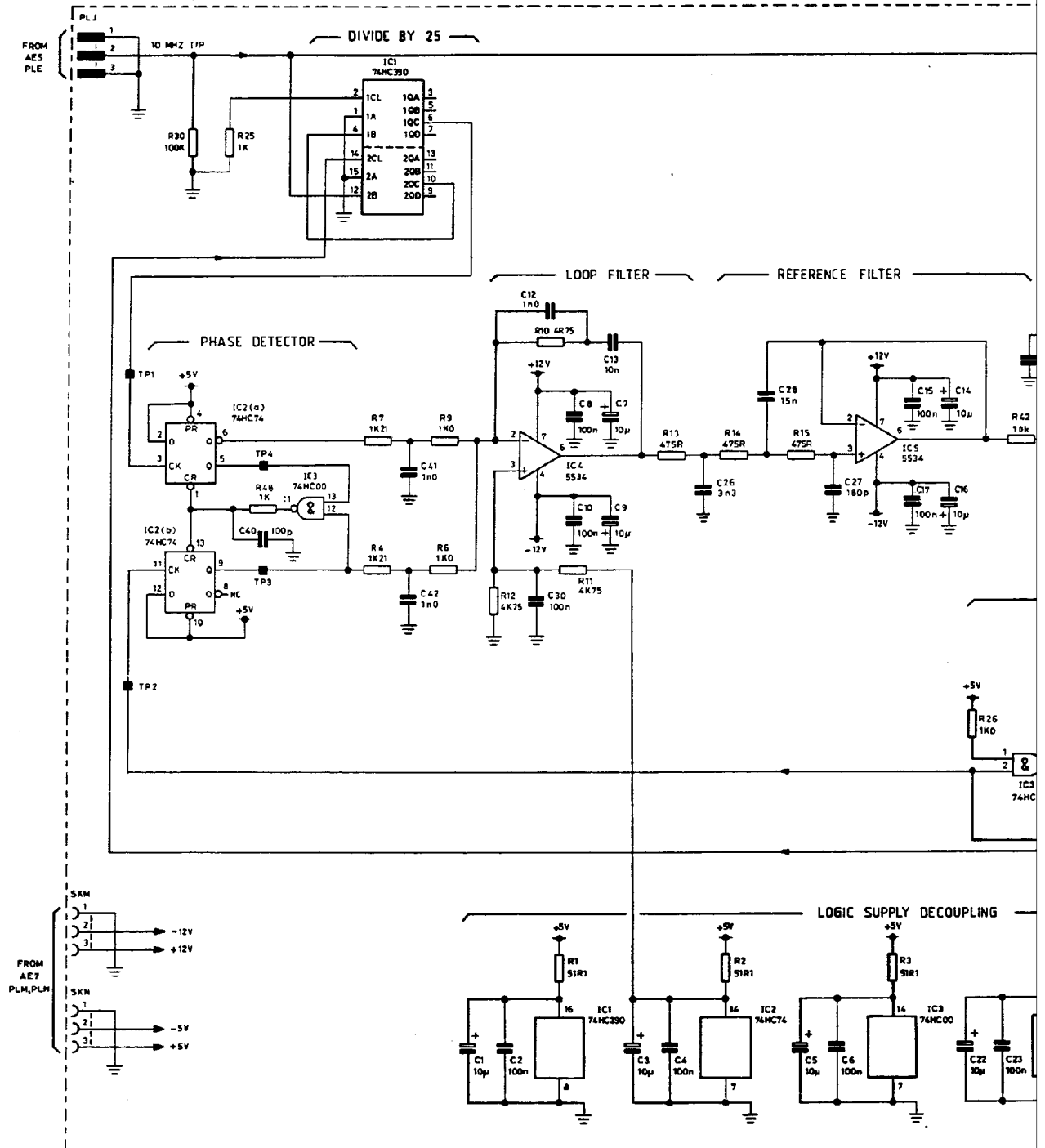
FM offset correction and ranging, 80 kHz LP filter **AE7**

Drg. No. 44829/99



Component layout **AE8**





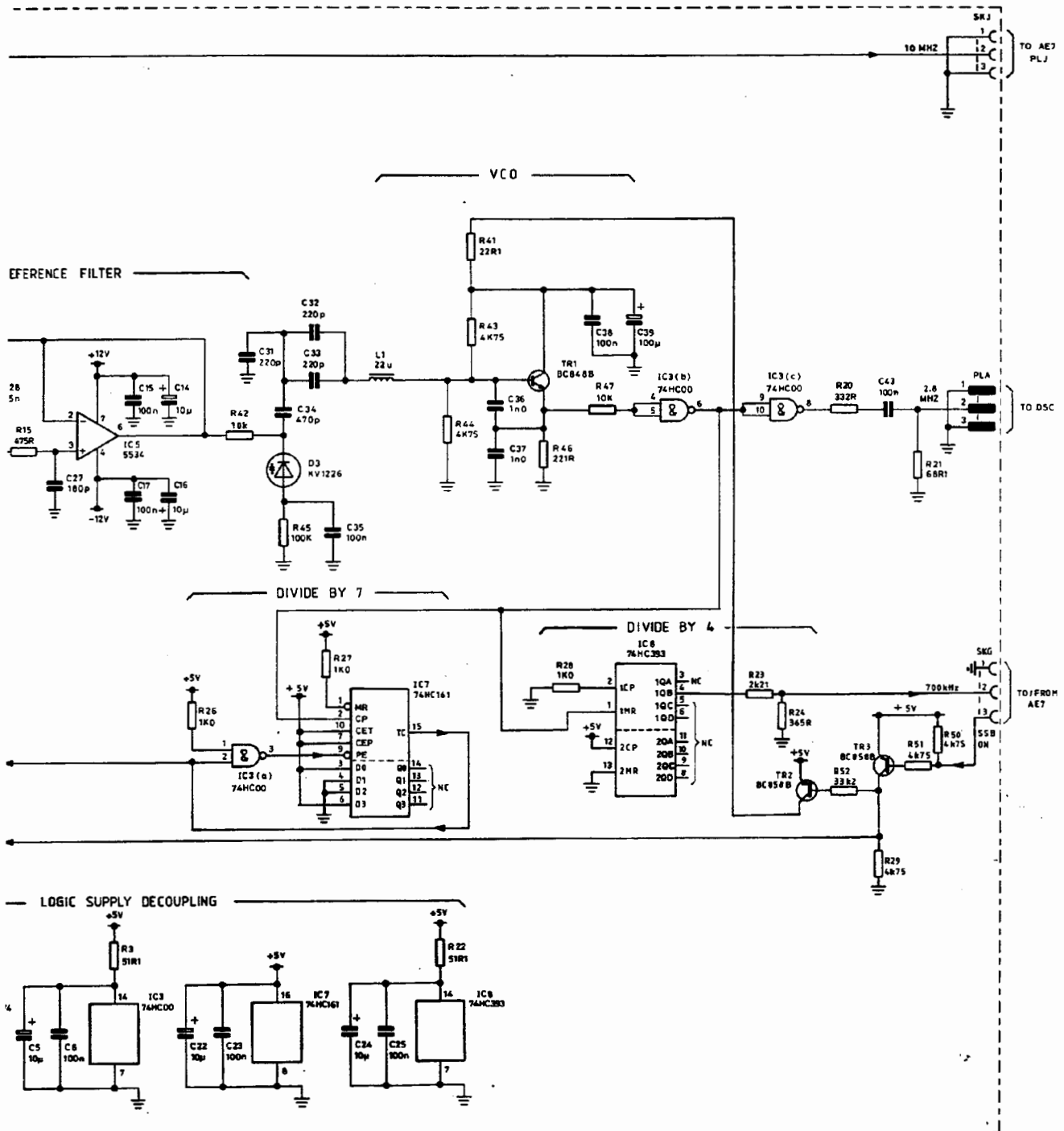
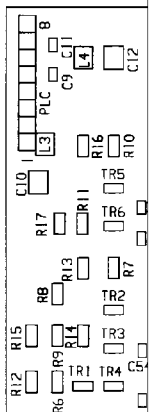
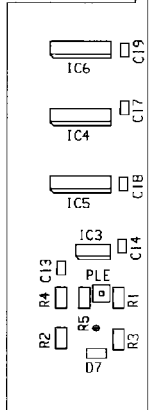
Circuit diagram **AE8**

Fig. 7-168 AE8 SSB BFO - circuit

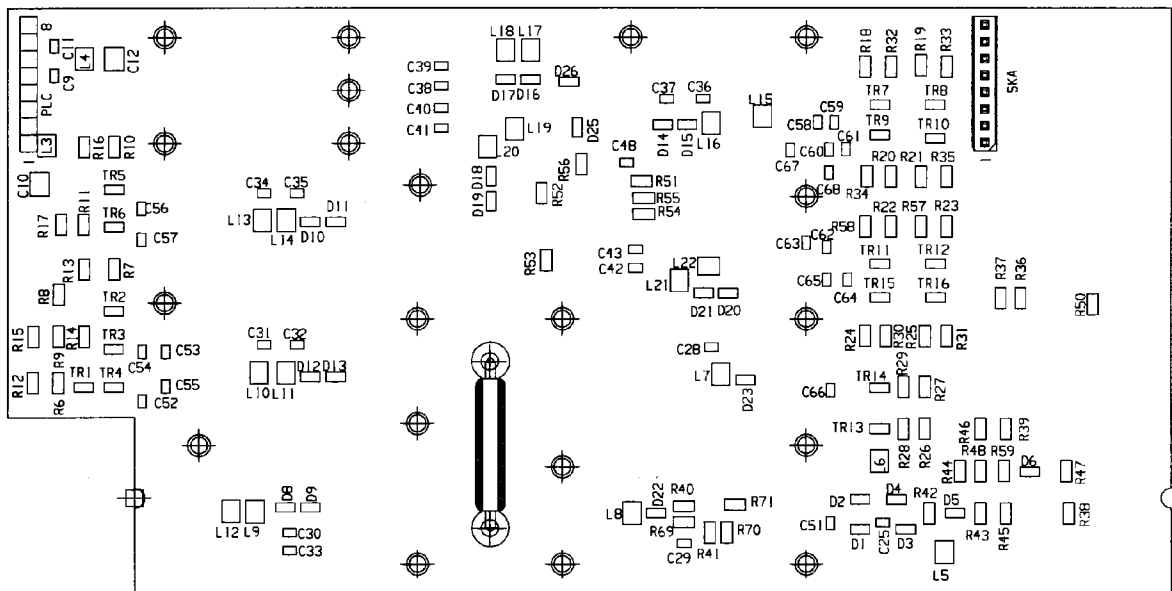
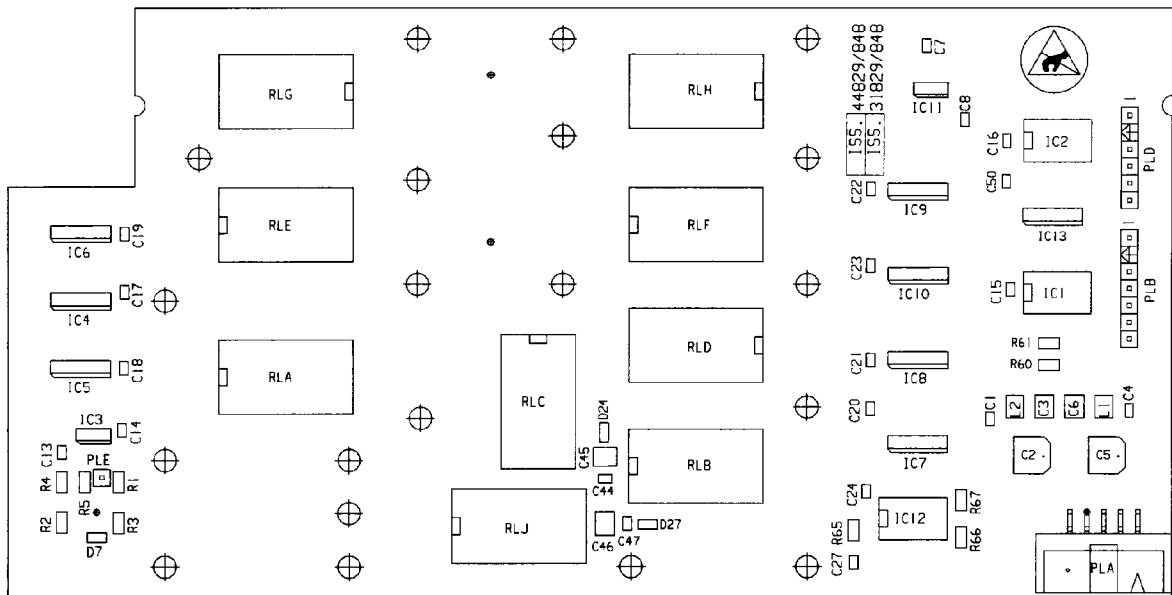
# SERVICING DIAGRAMS



**SSB BFO AE8**

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# Component layout AA1



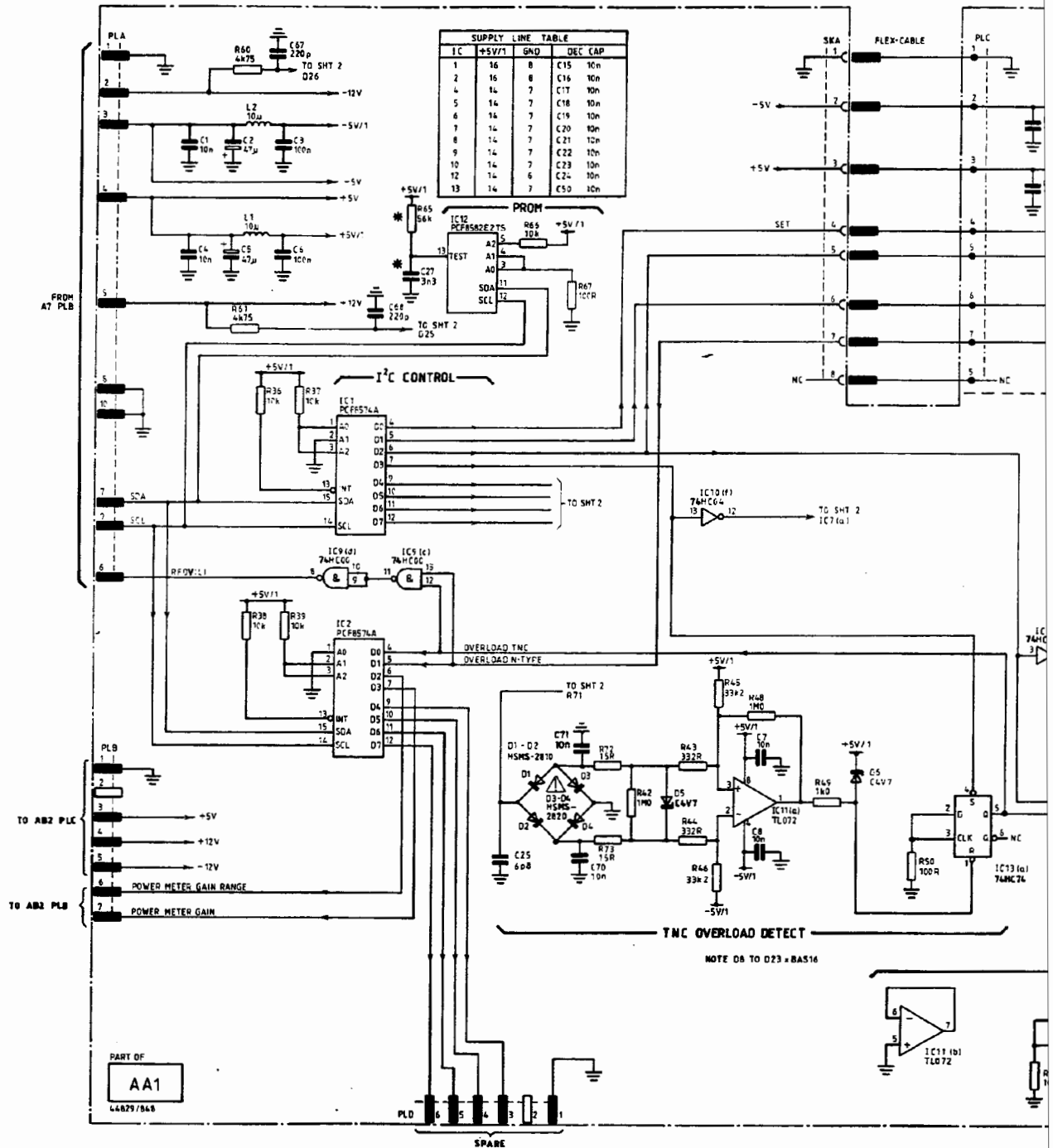
E8

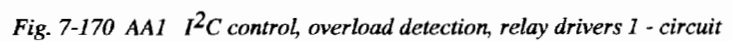
Drg. No. 44829/848 Sheet 1 of 1 Issue 5

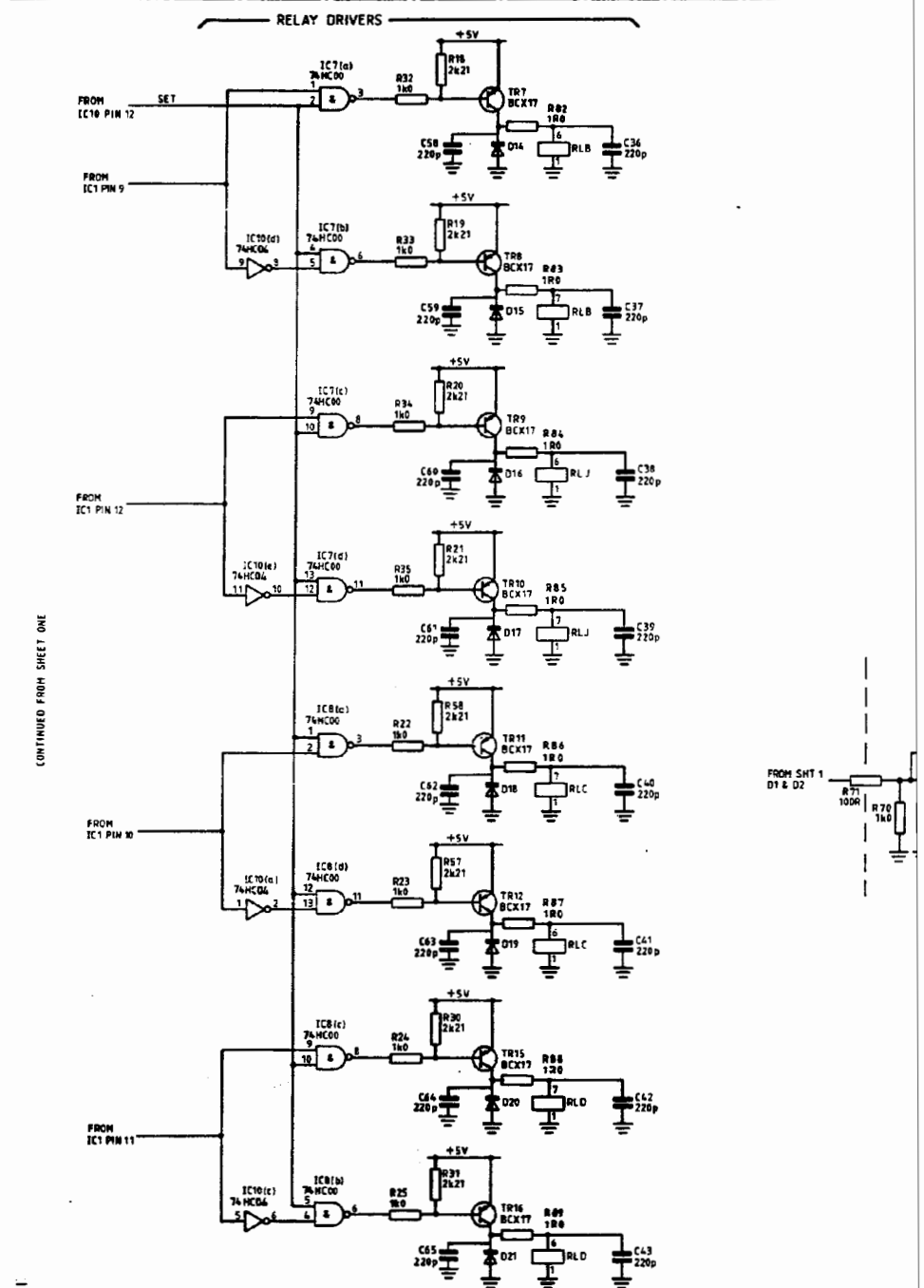
Fig. 7-169 AA1 Input switch - component layout

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NOTE  
 \* R65 & C27 ONLY FITTED WHEN  
 IC12 IS TYPE PCF6582AT.









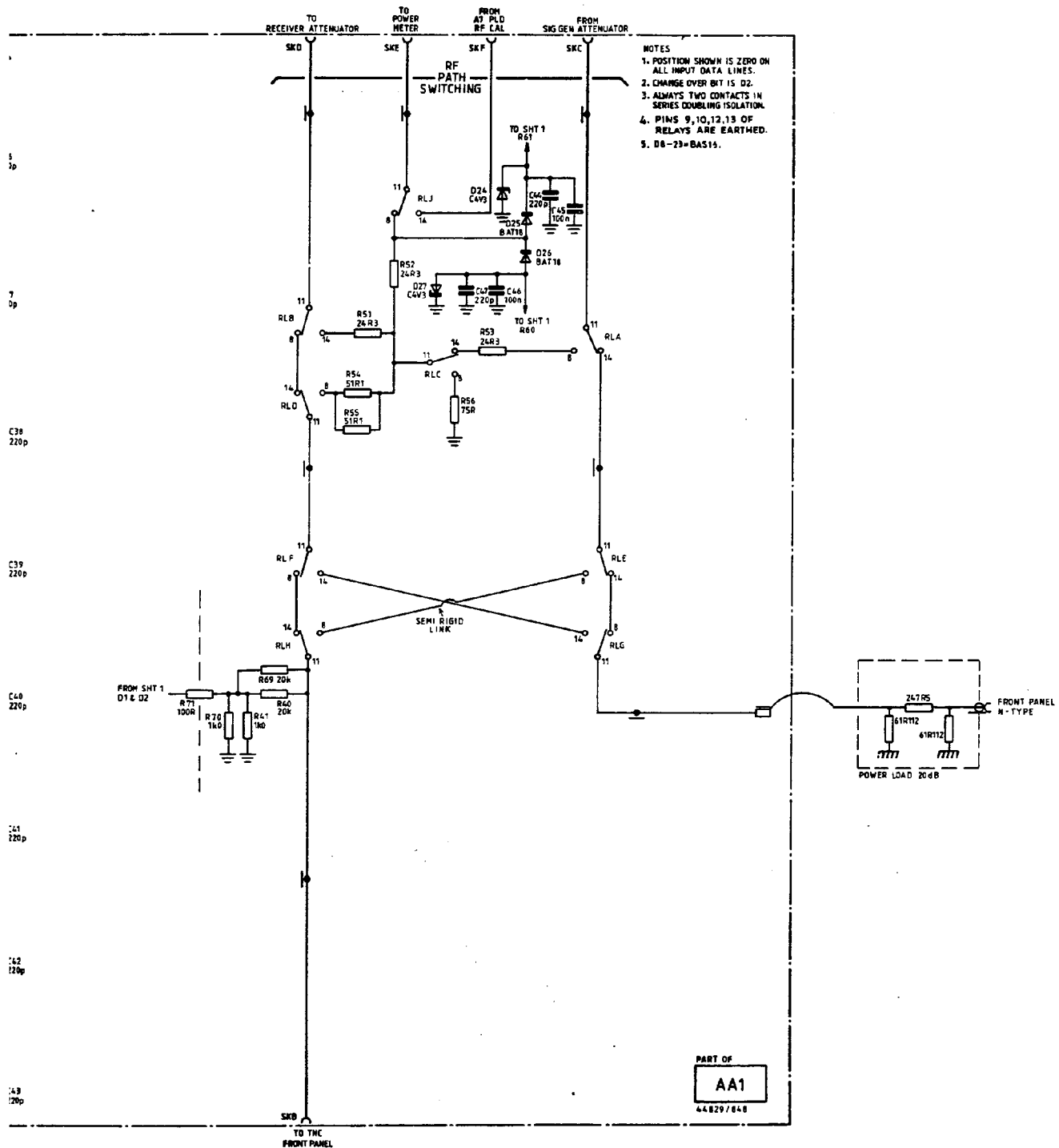
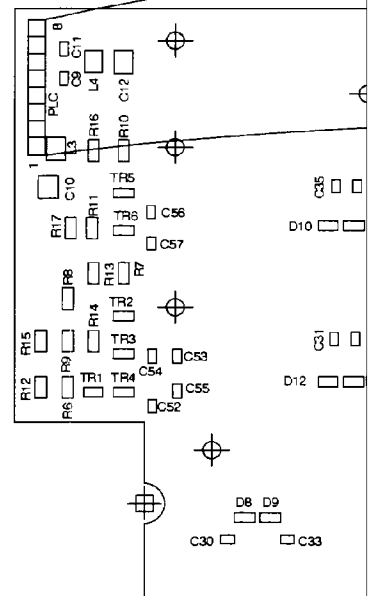
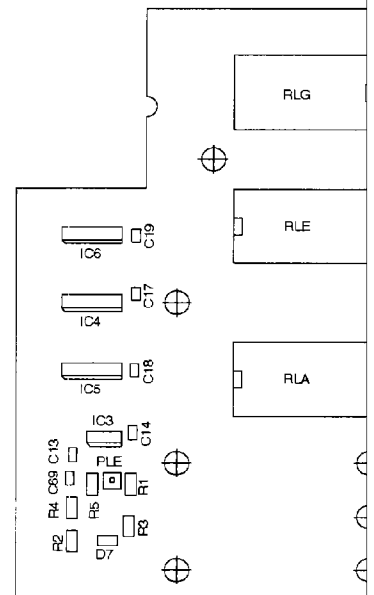
Circuit diagrams **AA1**

Fig. 7-171 AA1 Relay drivers 2, RF path switching - circuit

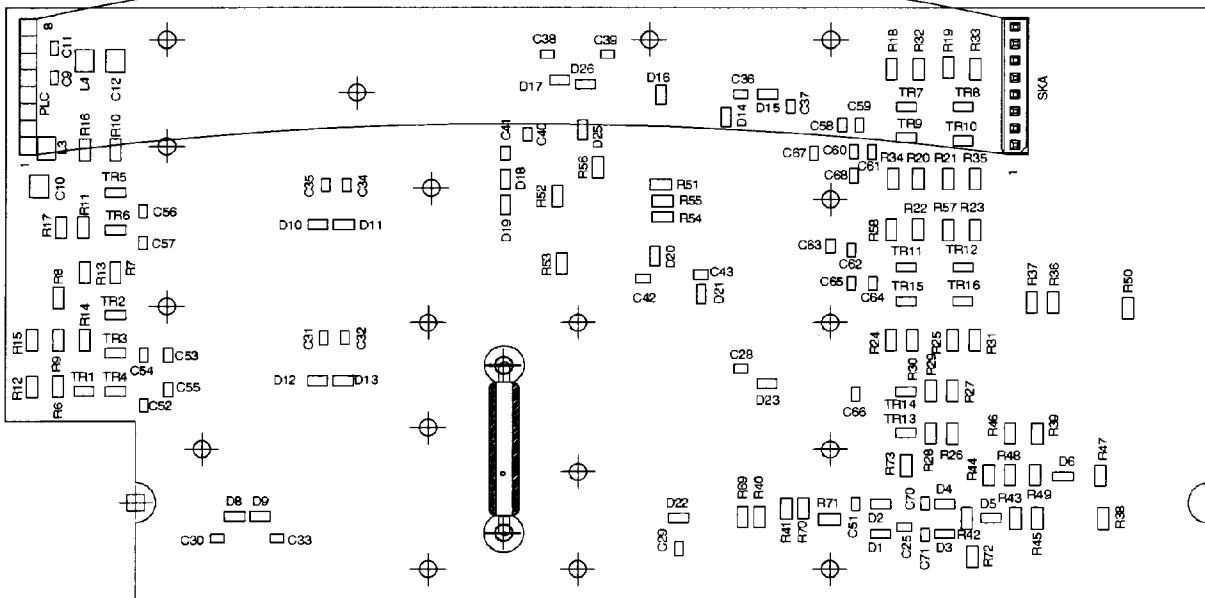
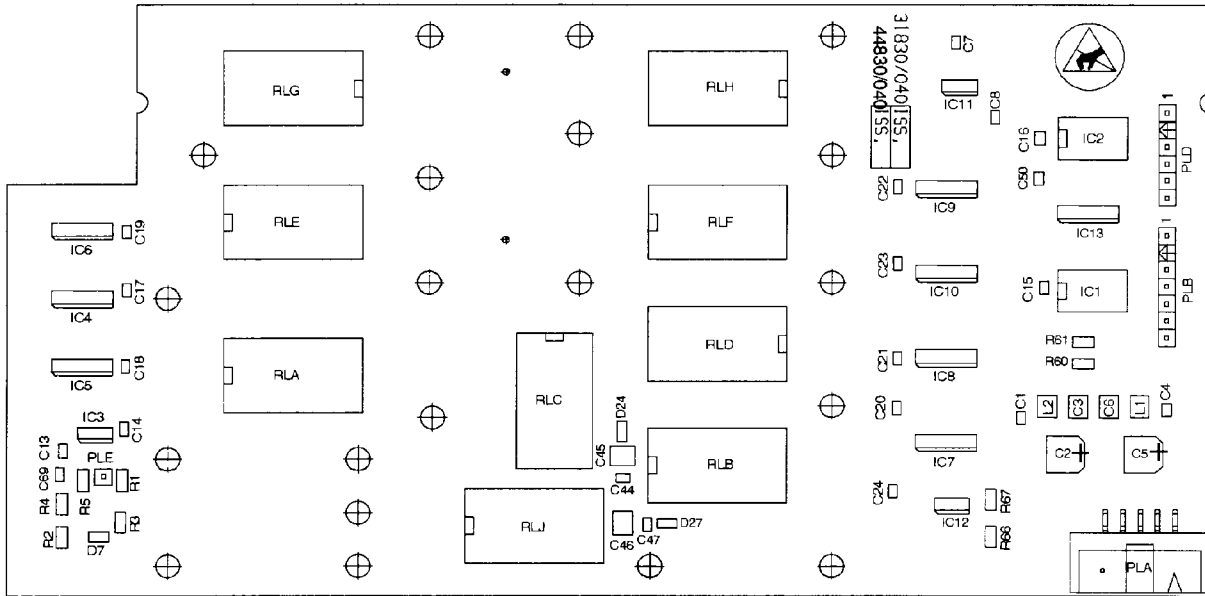
# SERVICING DIAGRAMS



**Relay drivers 2, RF path switching AA1**

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## Component layout **AA1/1**

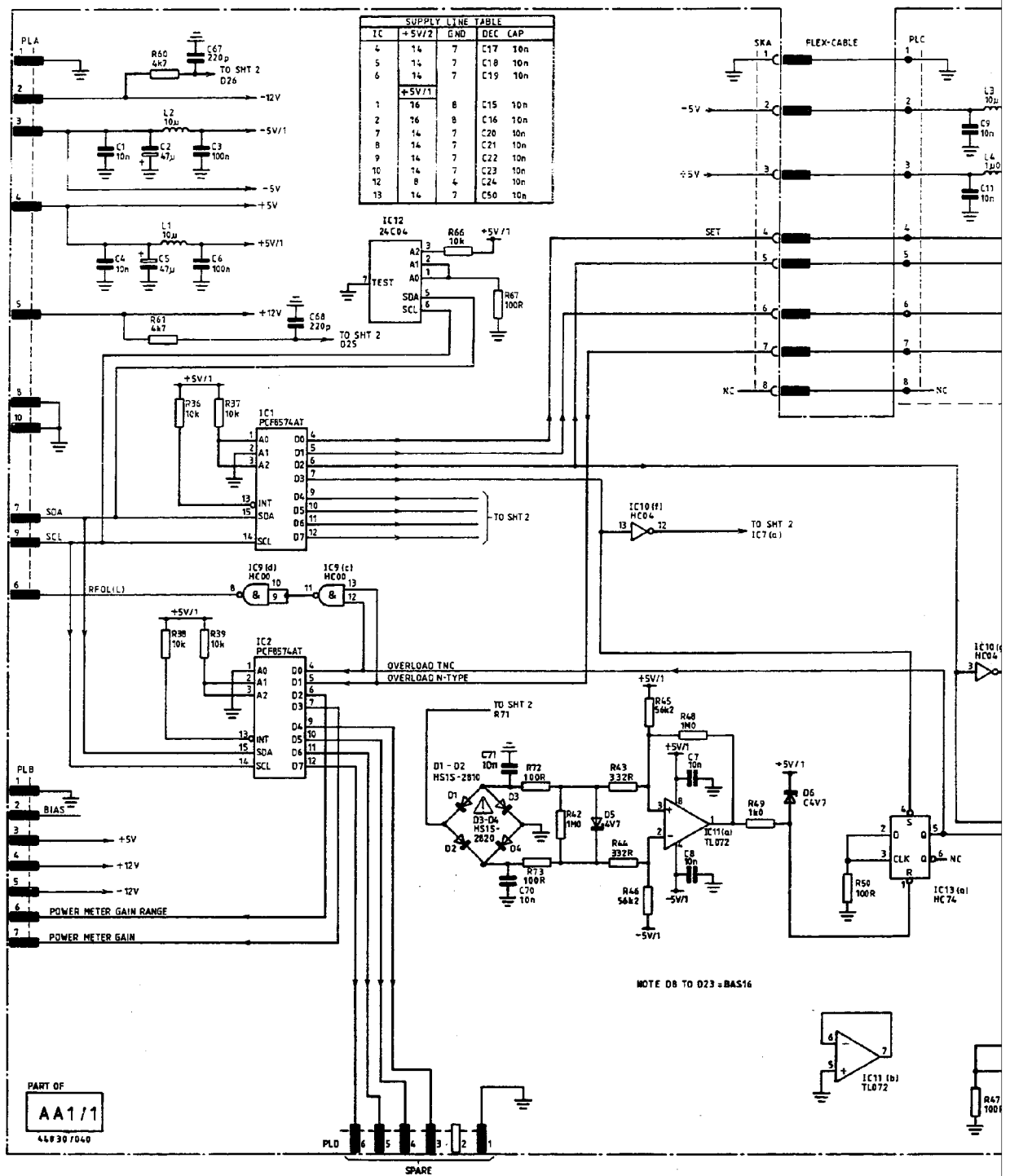


## A1

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Fig. 7-172 AA1/1 Input switch - component layout

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Circuit diagrams **AA1/1**

THERMALLY IN CONTACT  
WITH 20dB POWER LOAD  
SEE SHEET 2

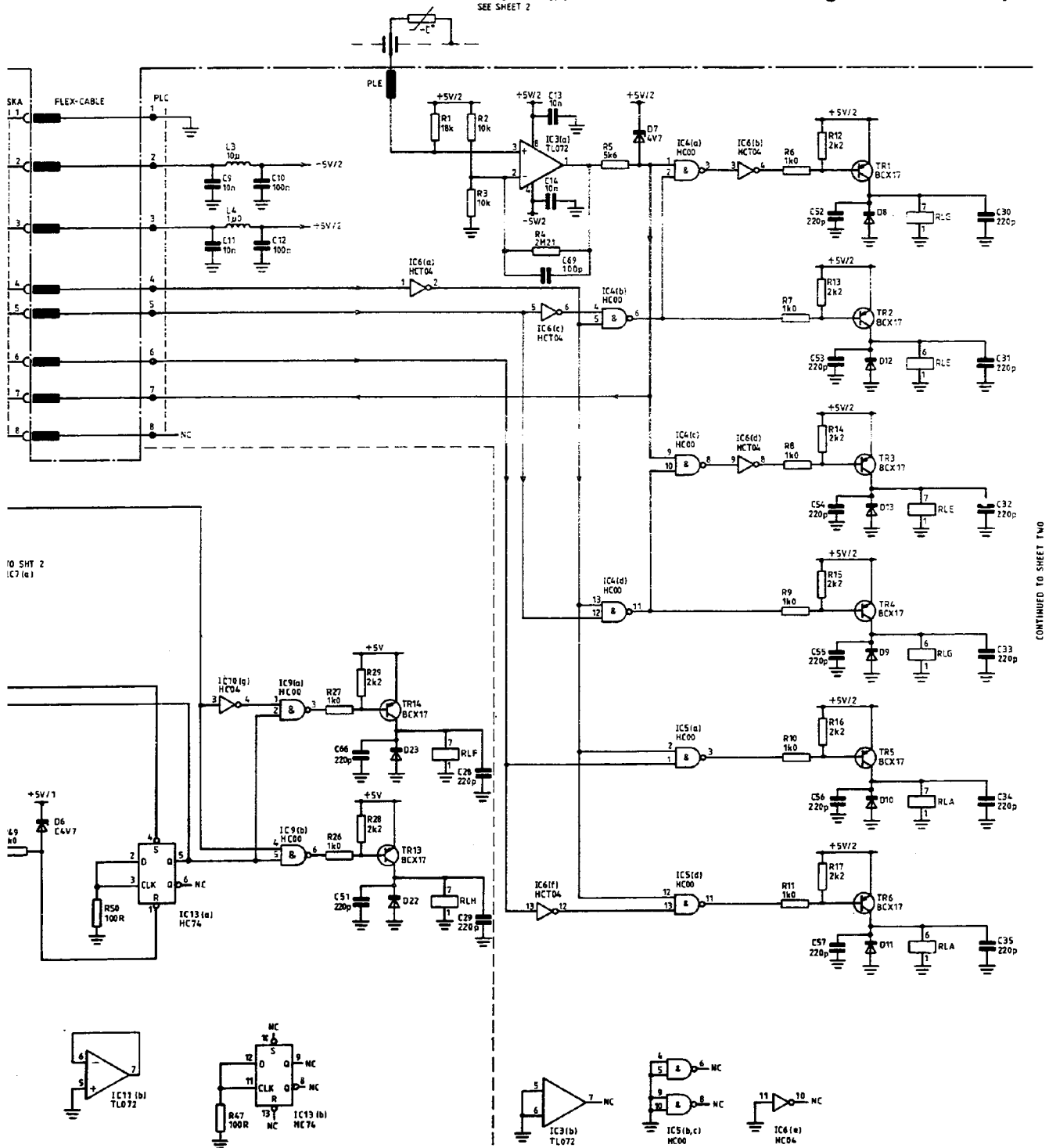
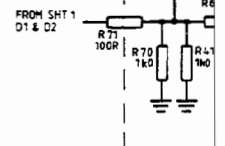
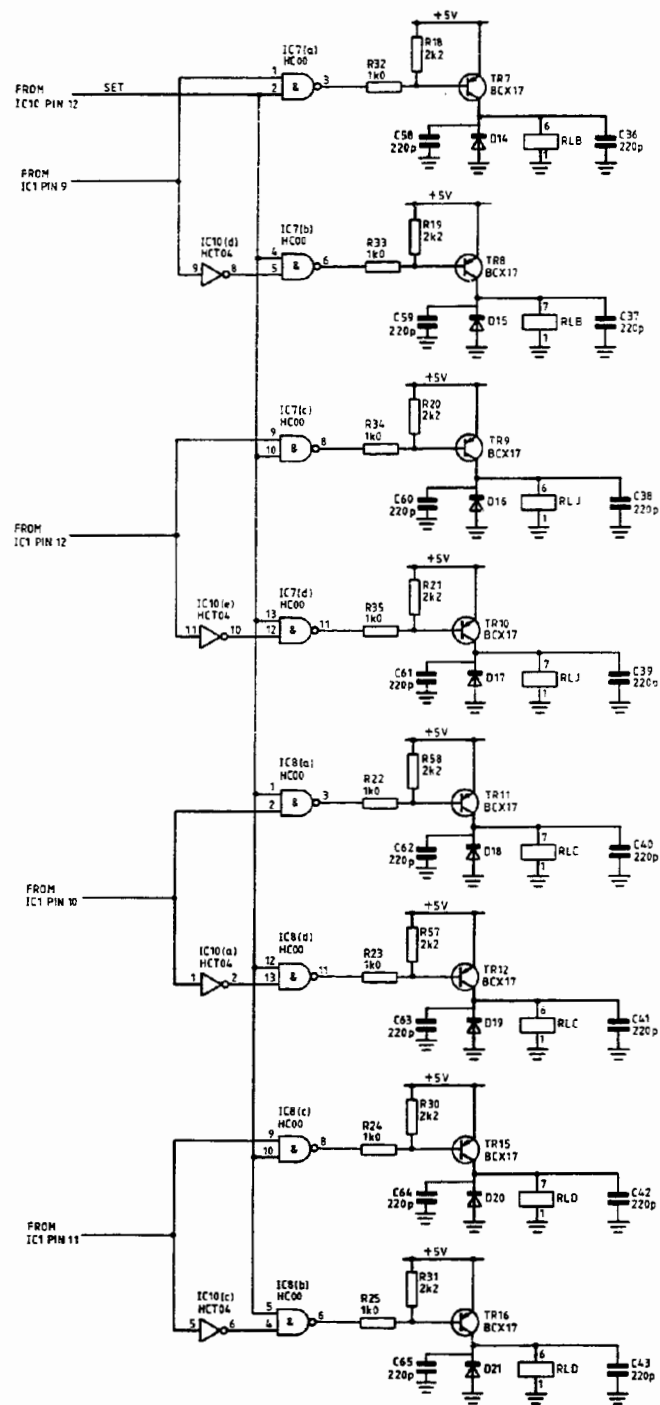


Fig. 7-173 AA1/1 I<sup>2</sup>C control, overload detection, relay drivers 1 - circuit

CONTINUED FROM SHEET ONE



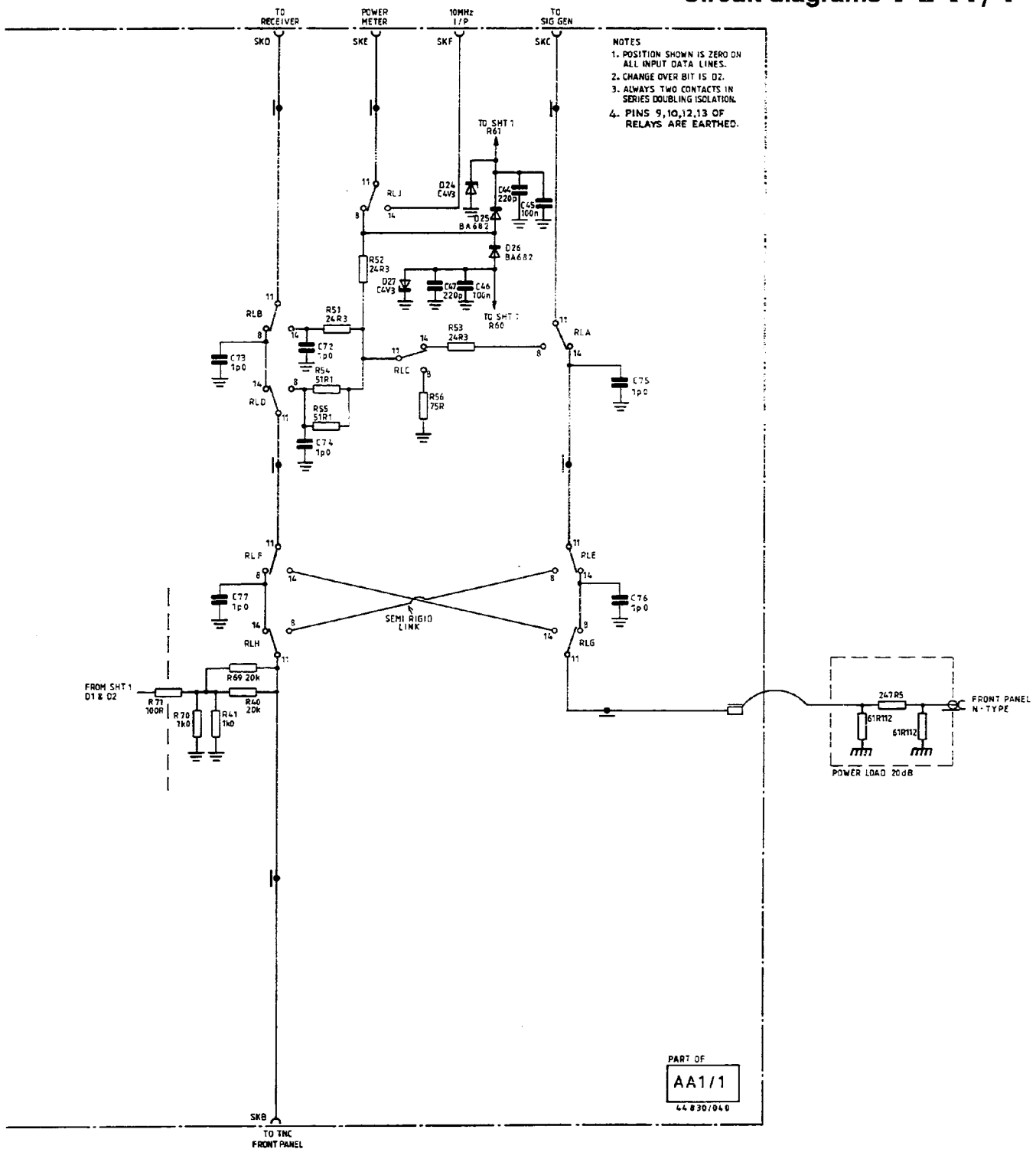
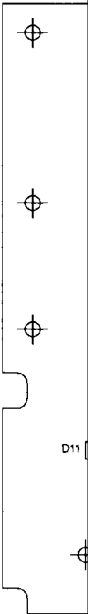
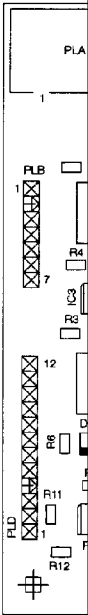
Circuit diagrams **AA1/1**

Fig. 7-174 AA1/1 Relay drivers 2, RF path switching - circuit

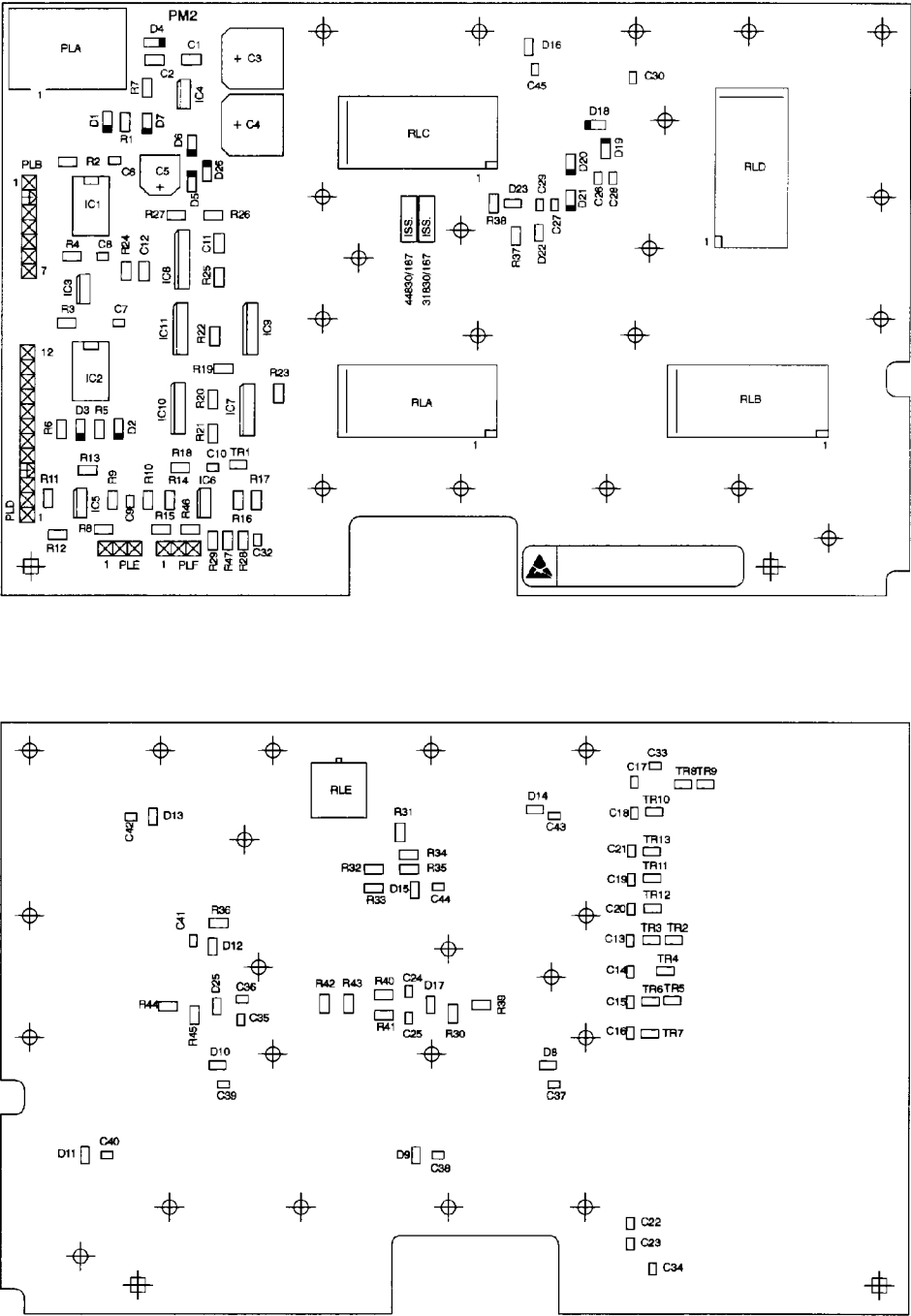


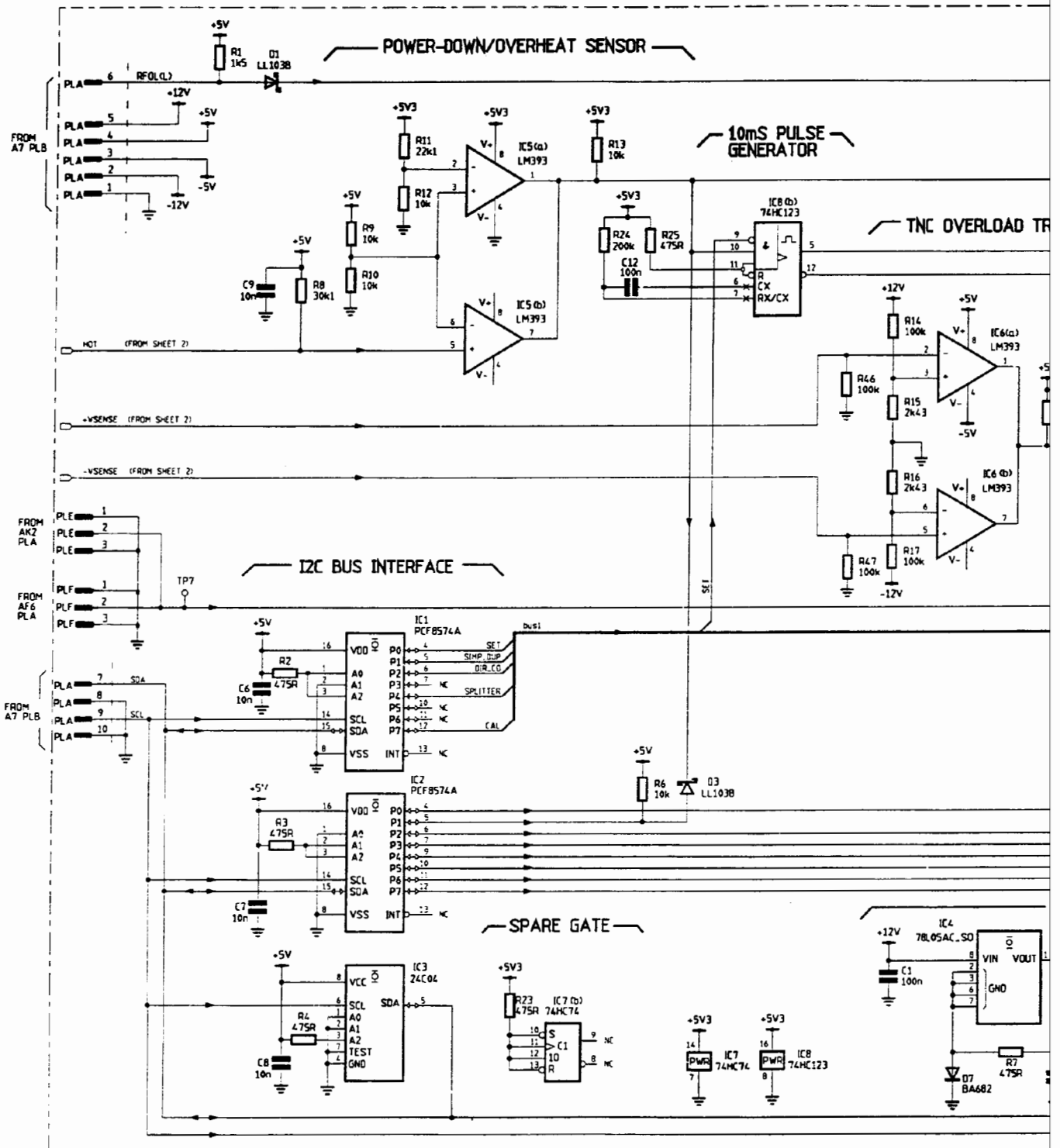
Relay drivers 2, RF path switching **AA1/1**

Drg. No. 44830/187 Sheet 1 of 1



Component layout **AA2**





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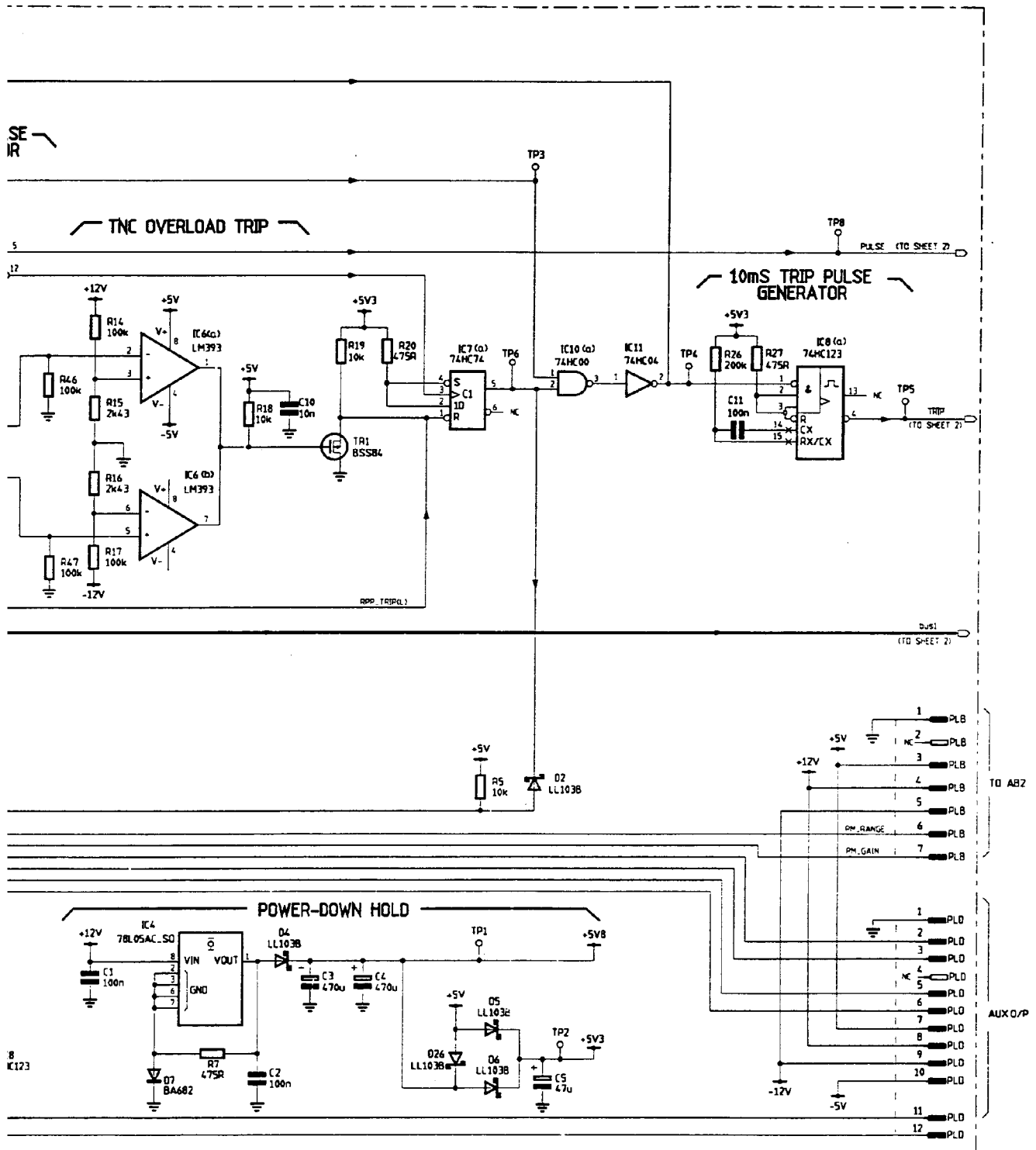
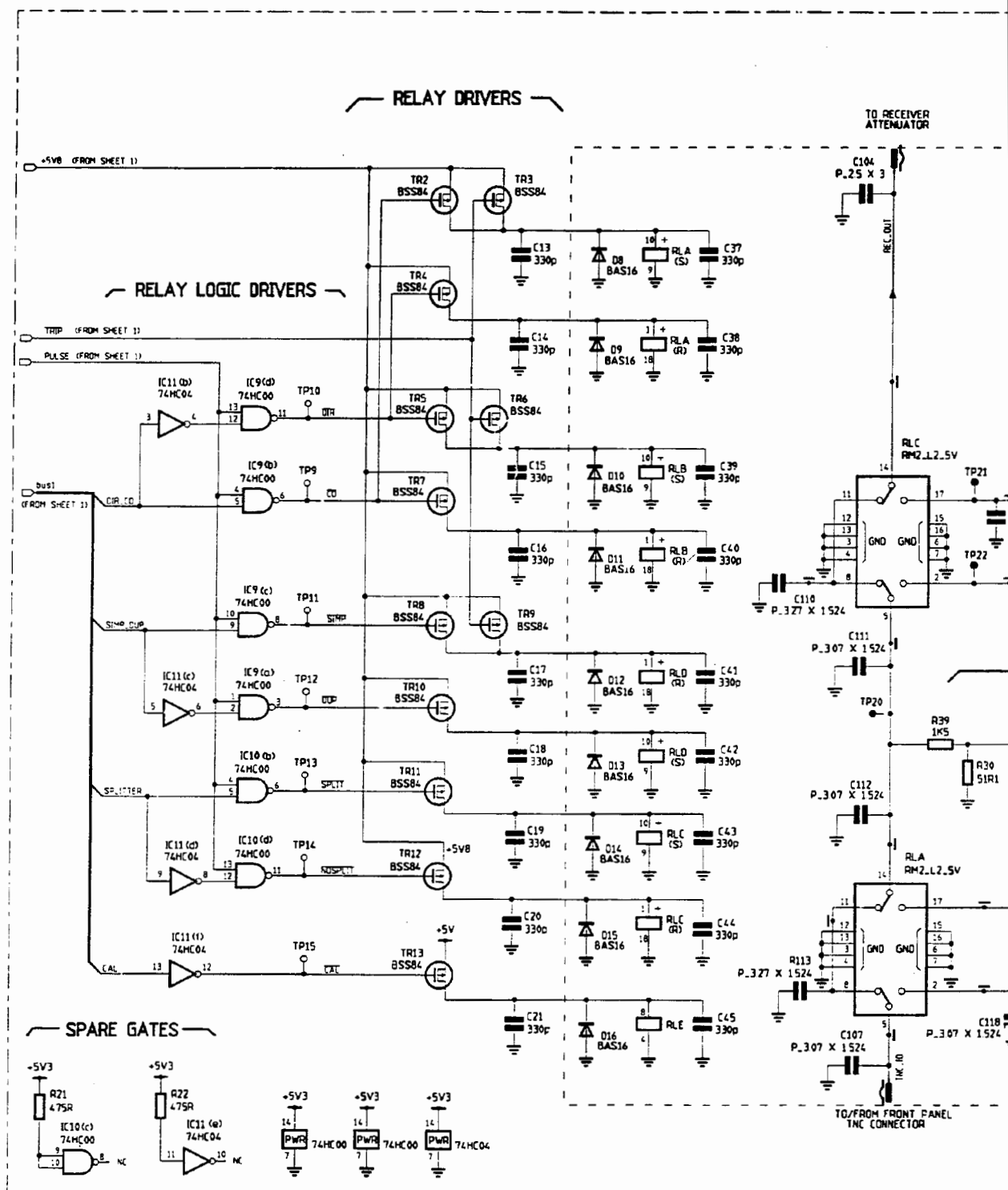
Circuit diagrams **AA2**

Fig. 7-176 AA2 Input switch - circuit



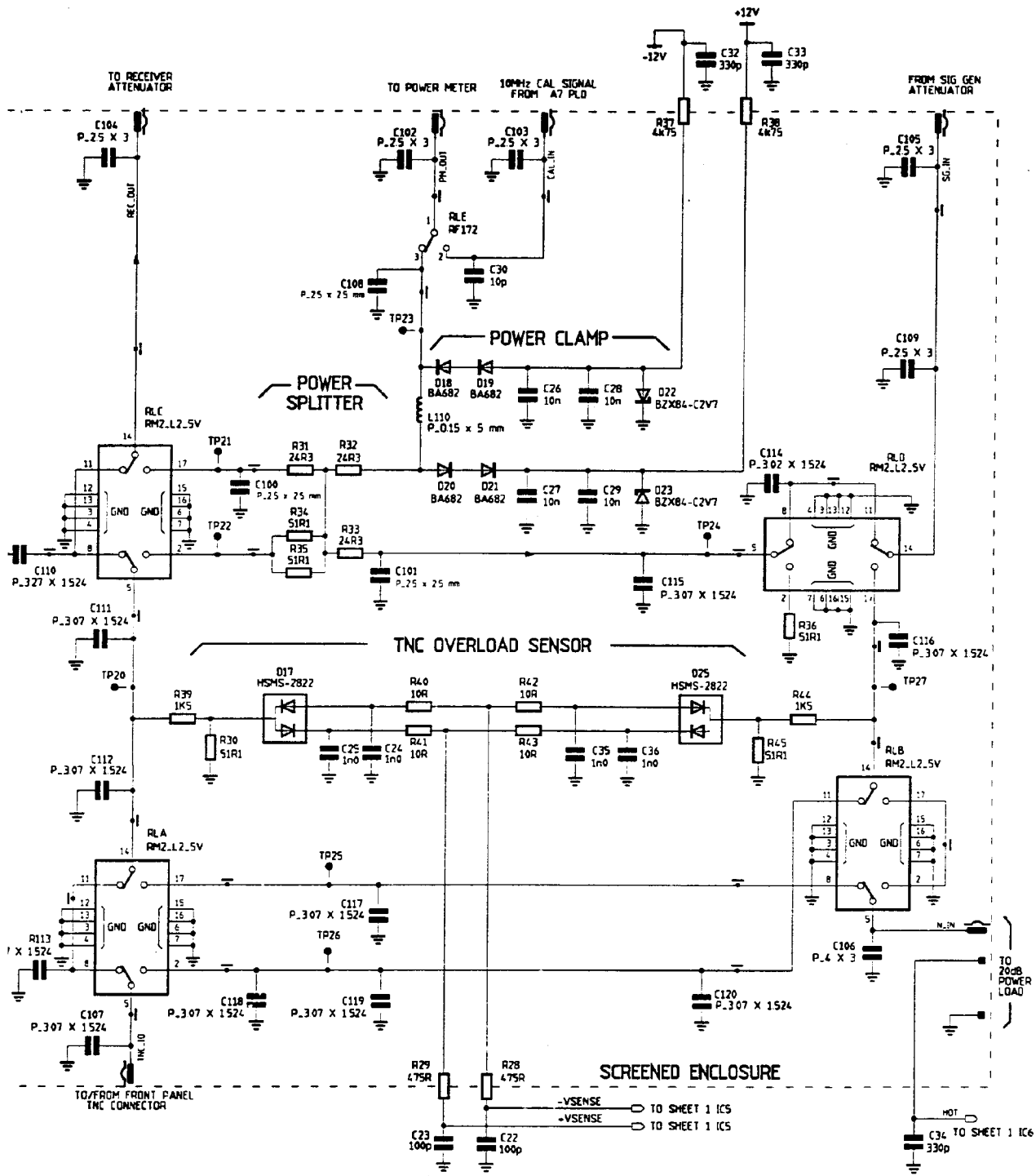
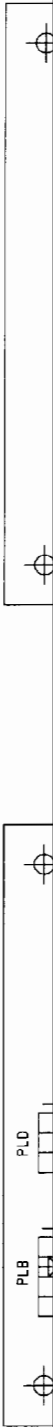
Circuit diagrams **AA2**

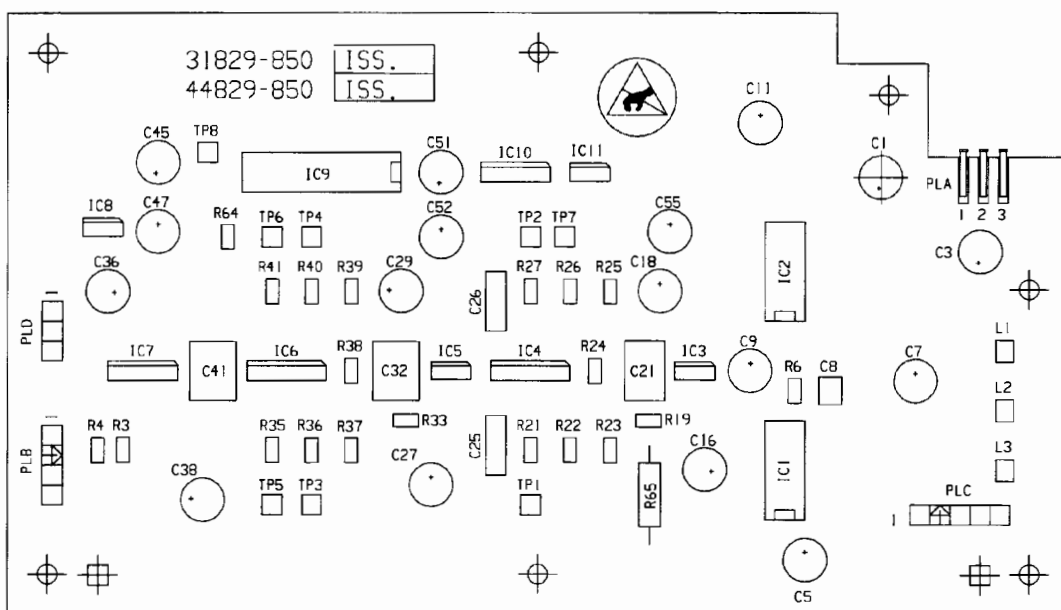
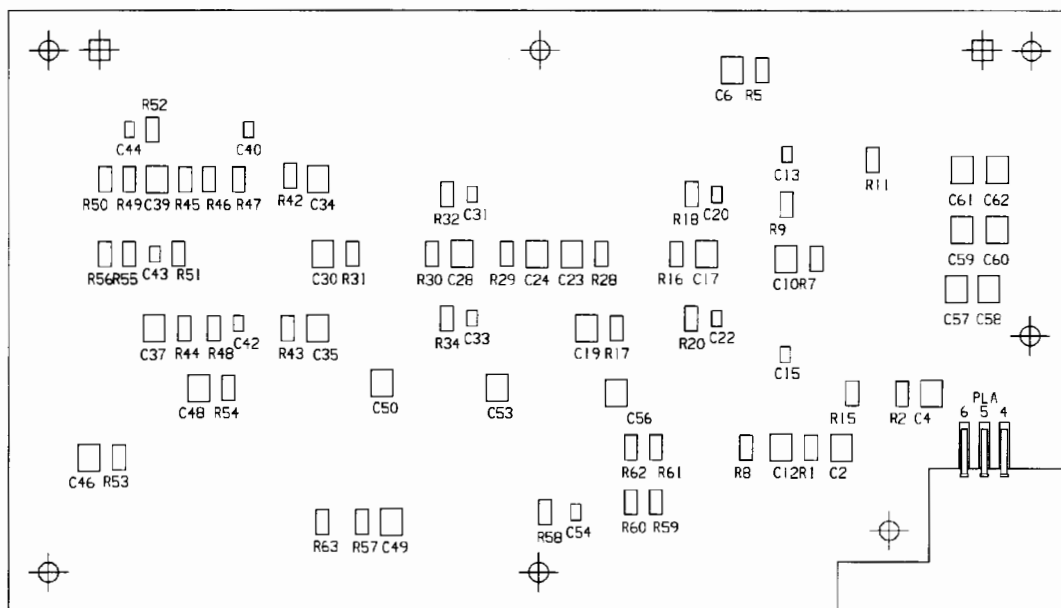
Fig. 7-177 AA2 Input switch - circuit

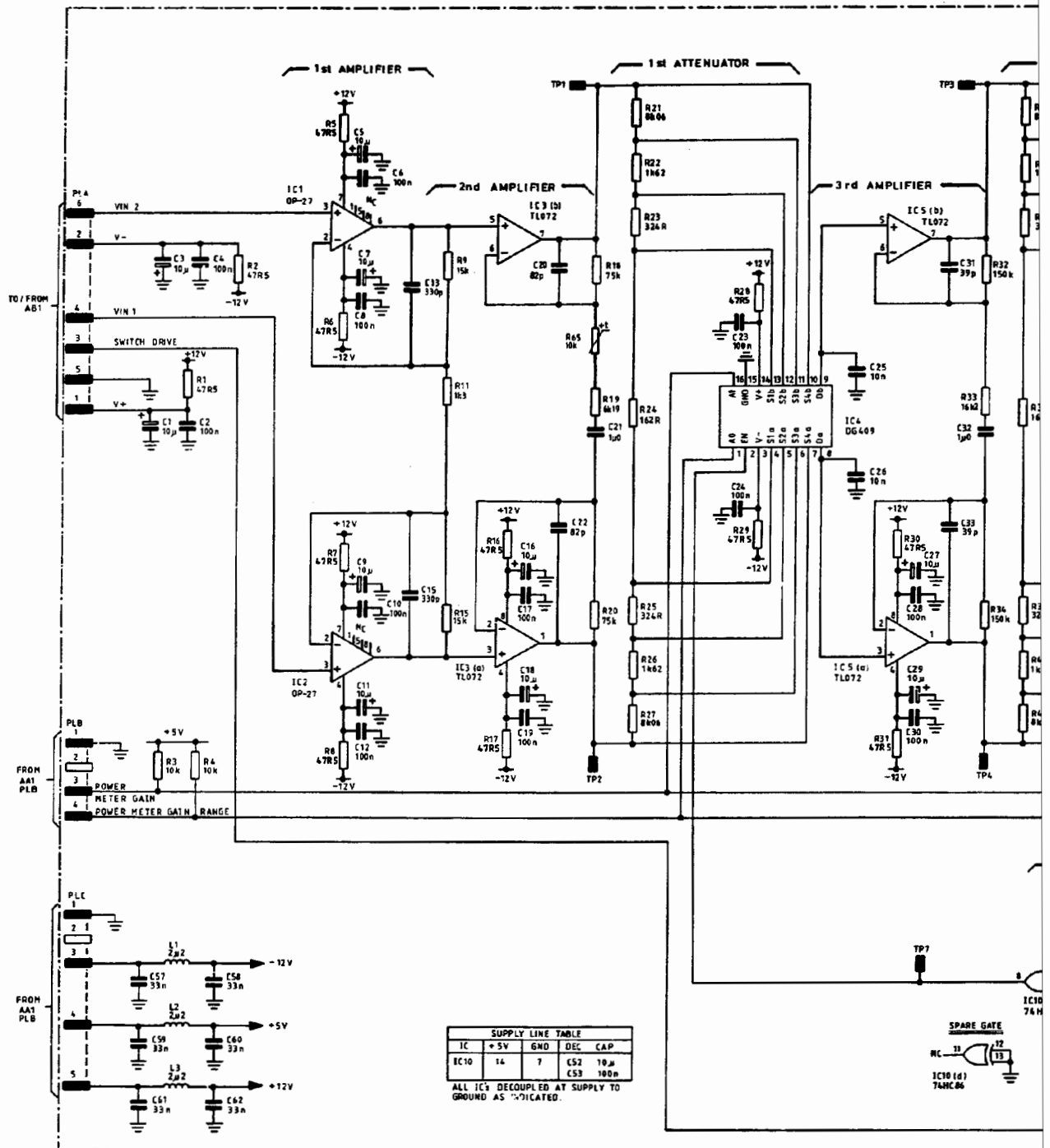


Input switch **AA2**

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## Component layout AB2







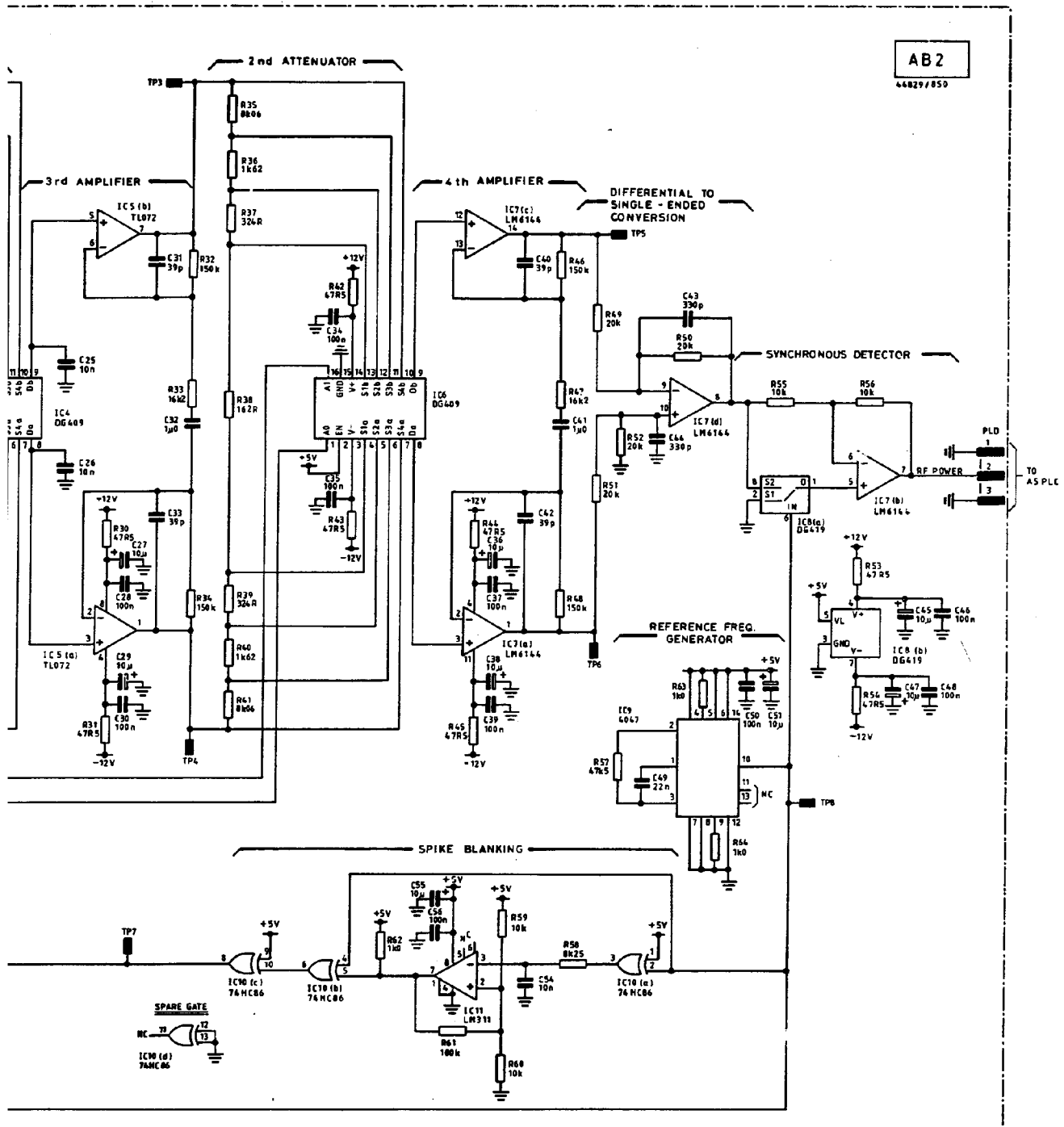
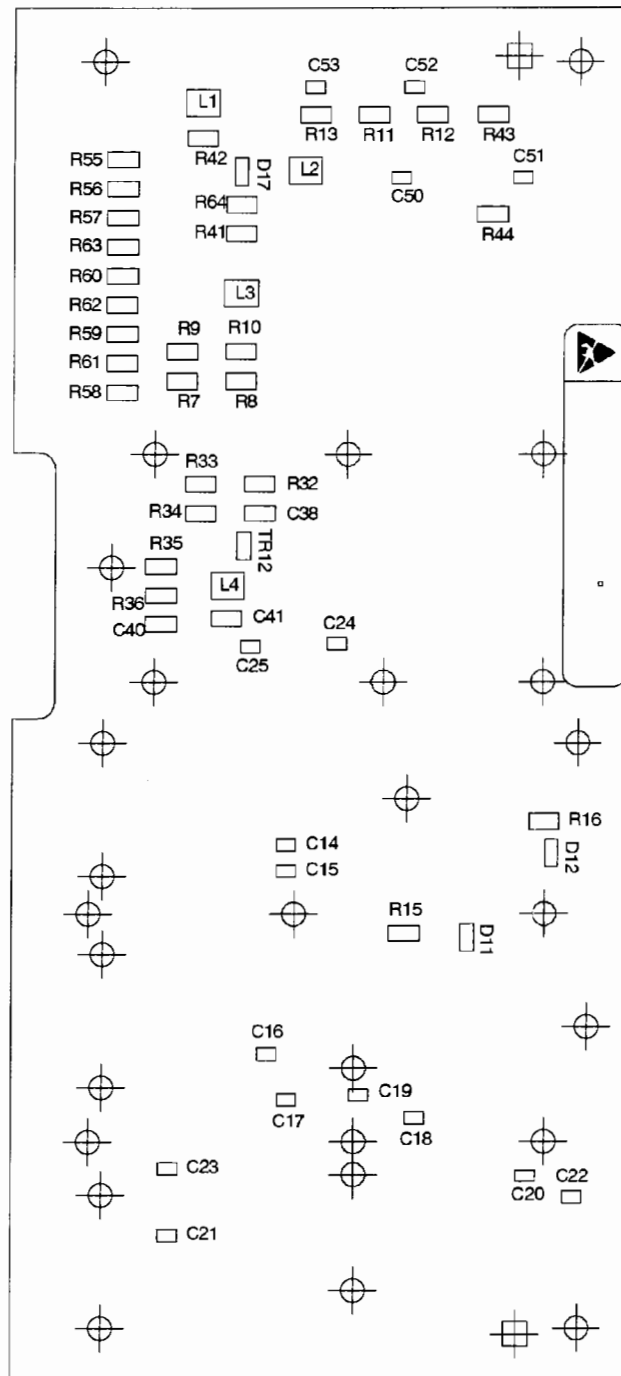
Circuit diagram **AB2**

Fig. 7-179 AB2 Power meter - circuit

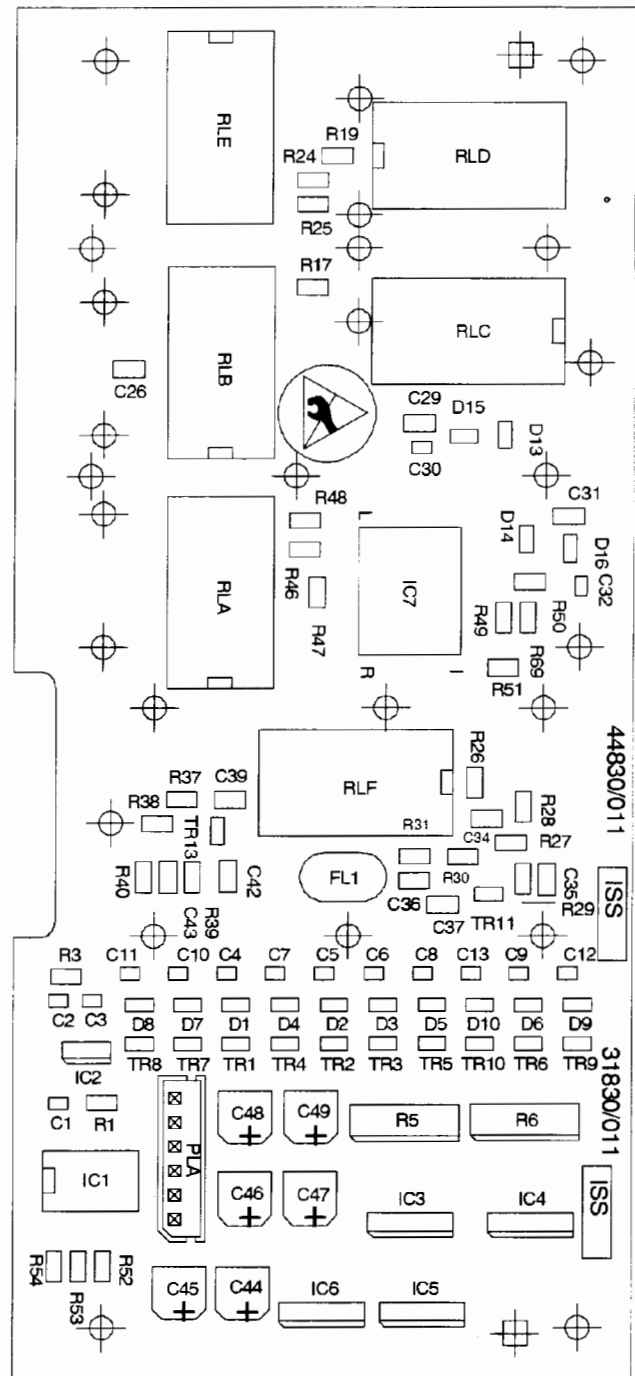
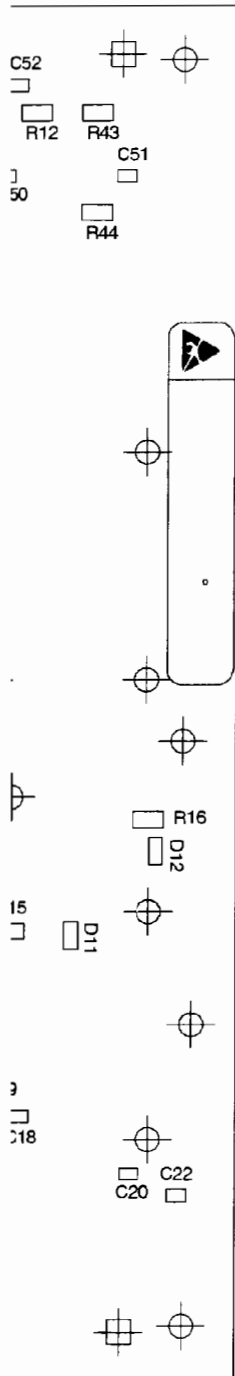
# SERVICING DIAGRAMS



**Power meter AB2**

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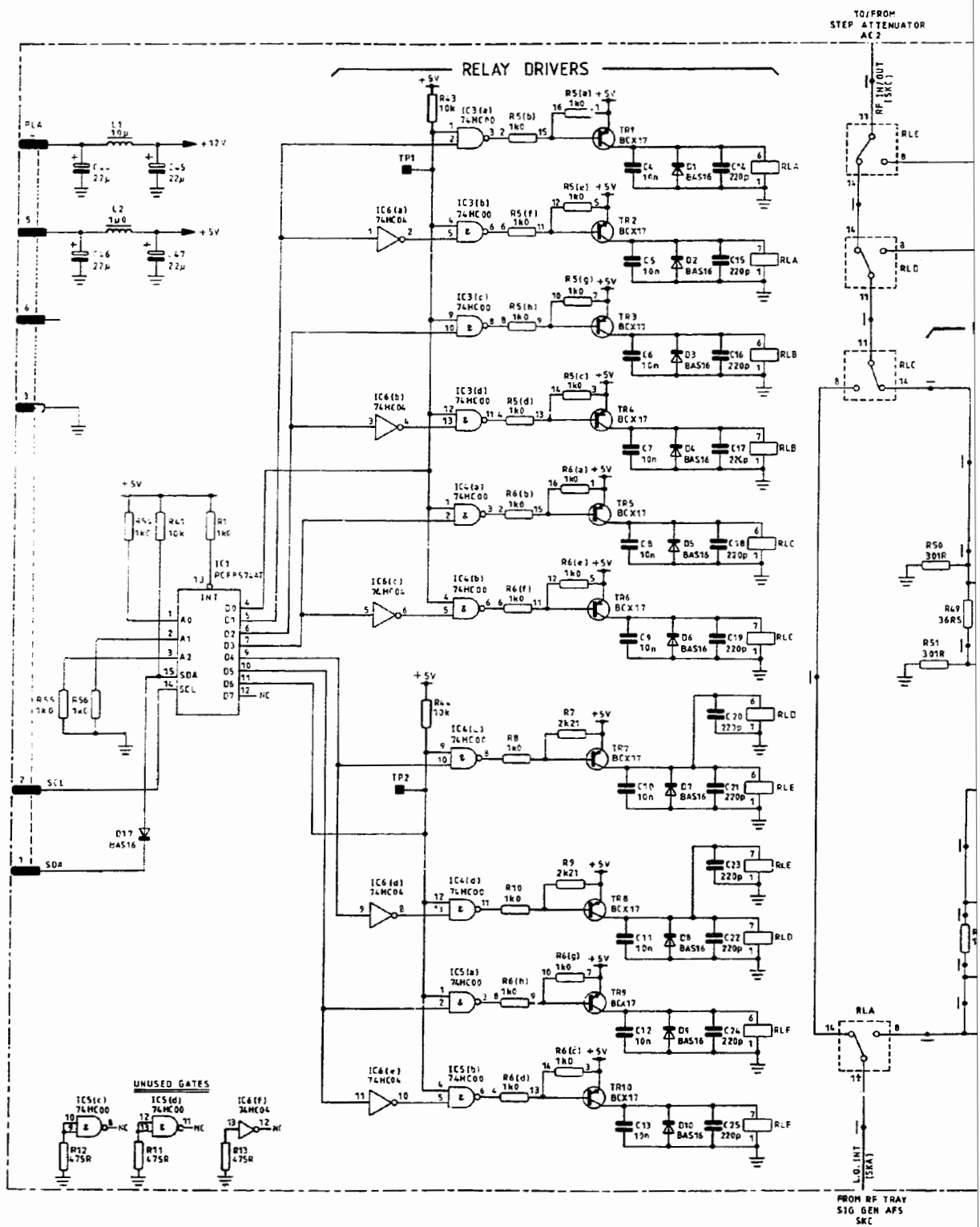
### Component layout **AB3**

**B2**

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Fig. 7-180 AB3 Mixer module - component layout

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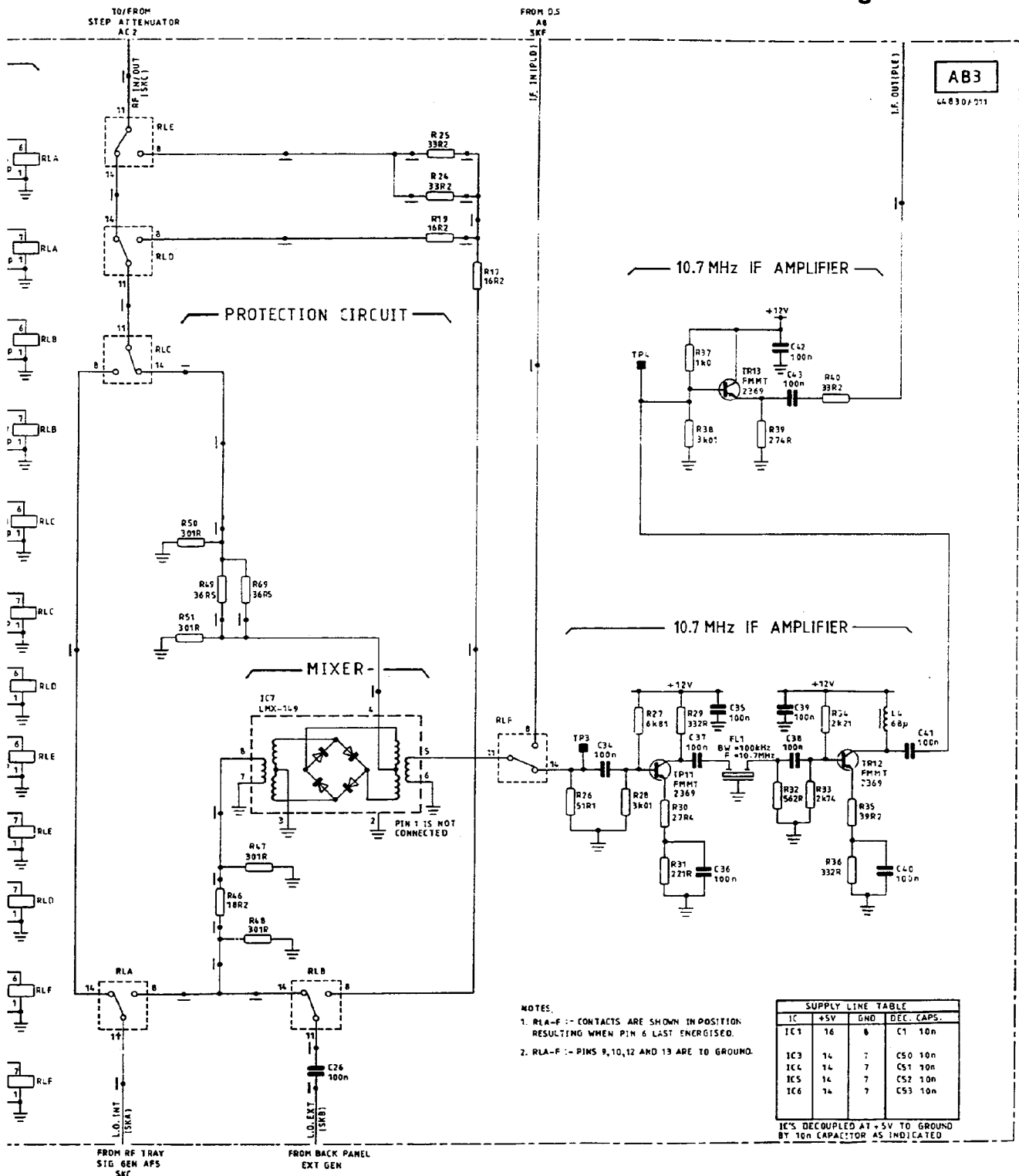
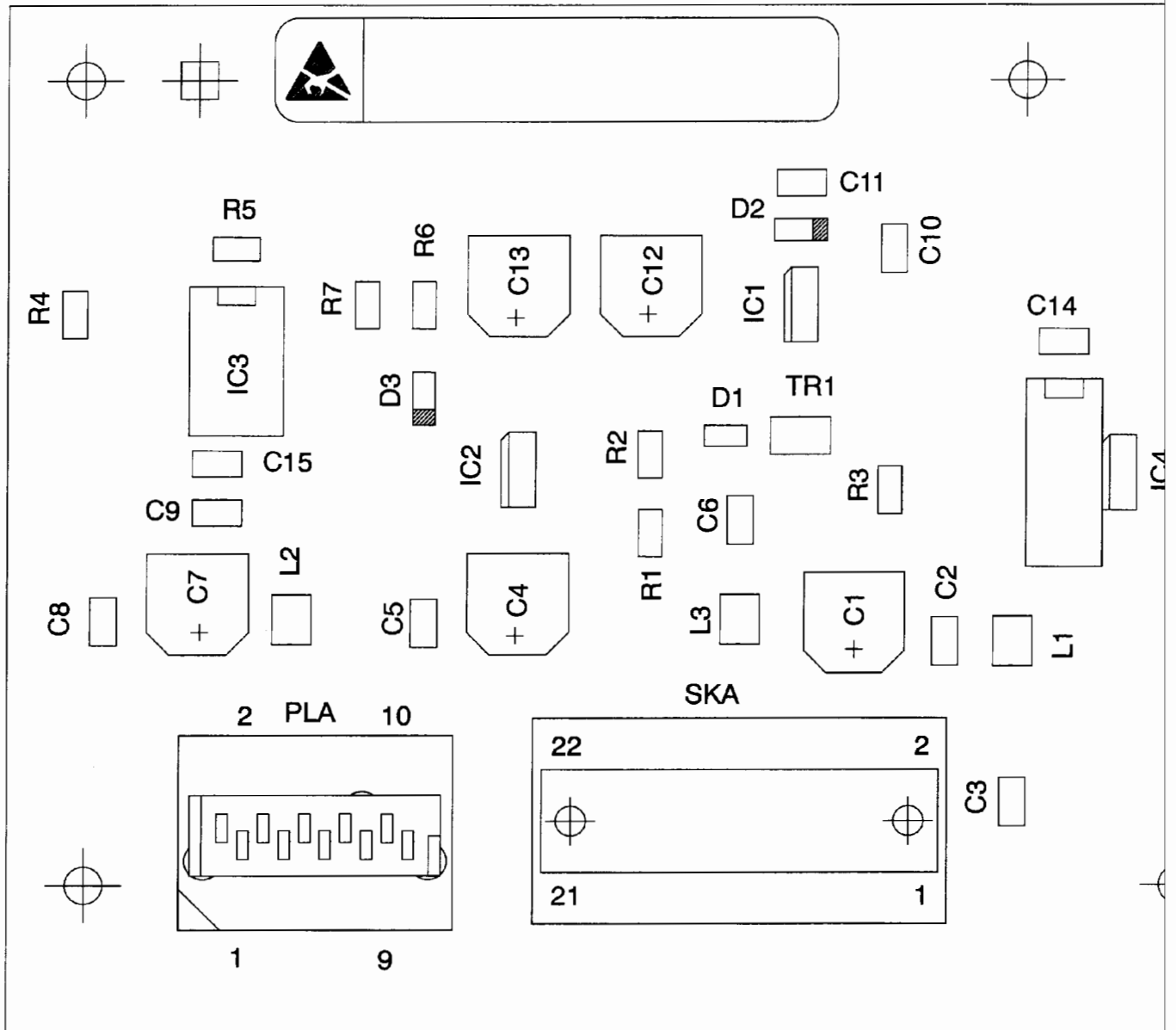
Circuit diagram **AB3**

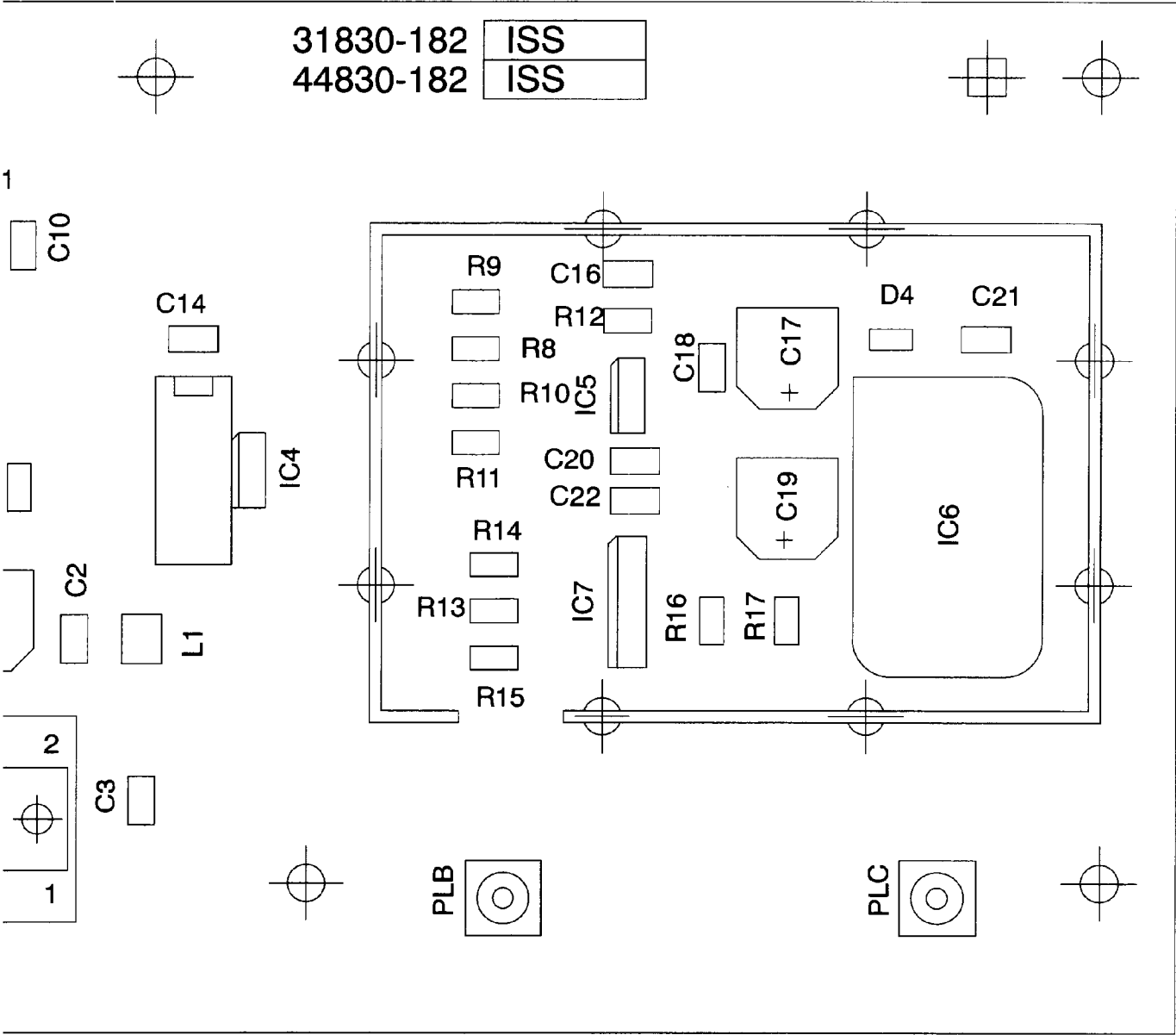
Fig. 7-181 AB3 Mixer module - circuit



Mixer module **AB3**

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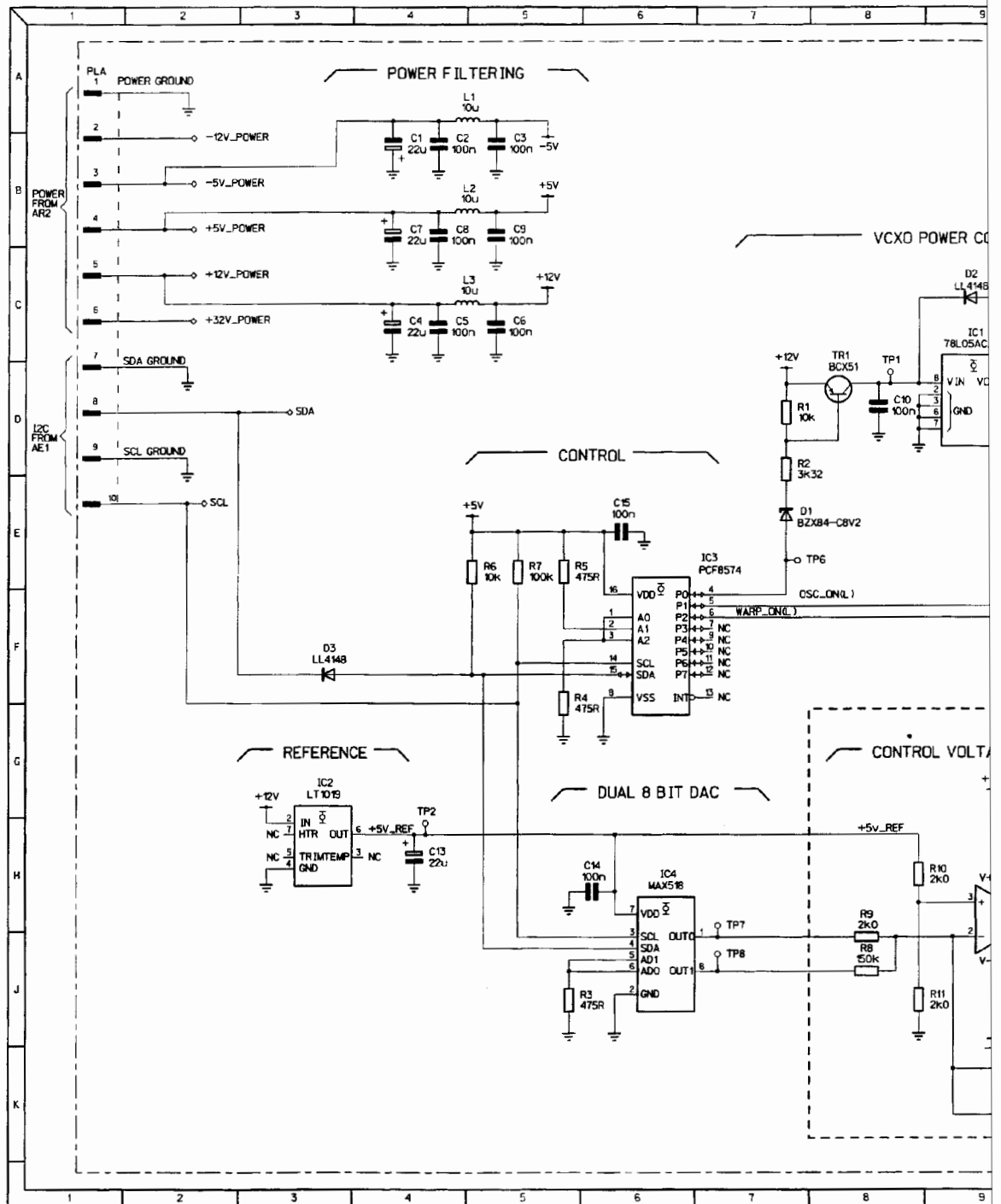
Component layout **AB4**



**AB3**

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Fig. 7-182 AB4 Warp oscillator- component layout





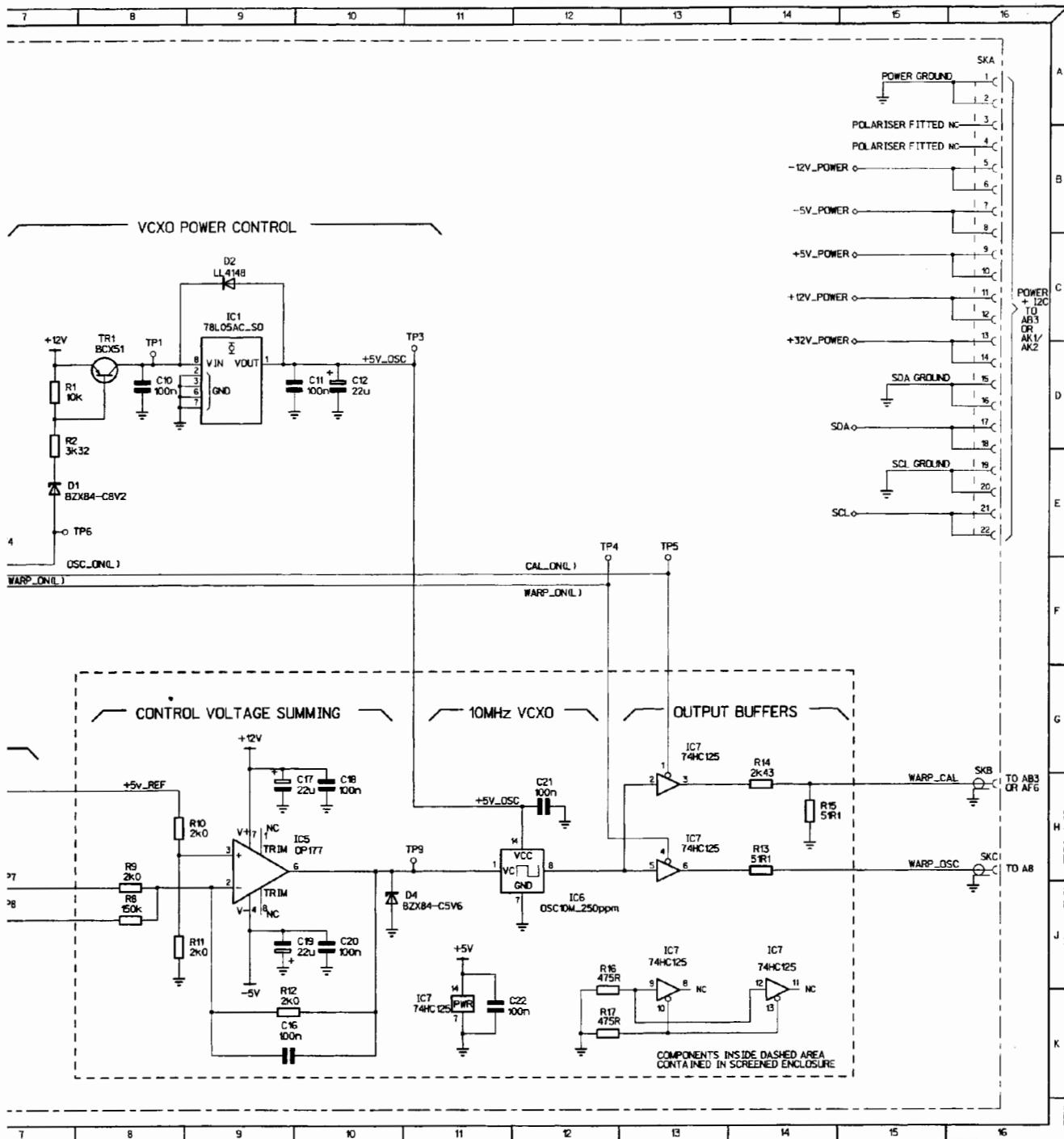
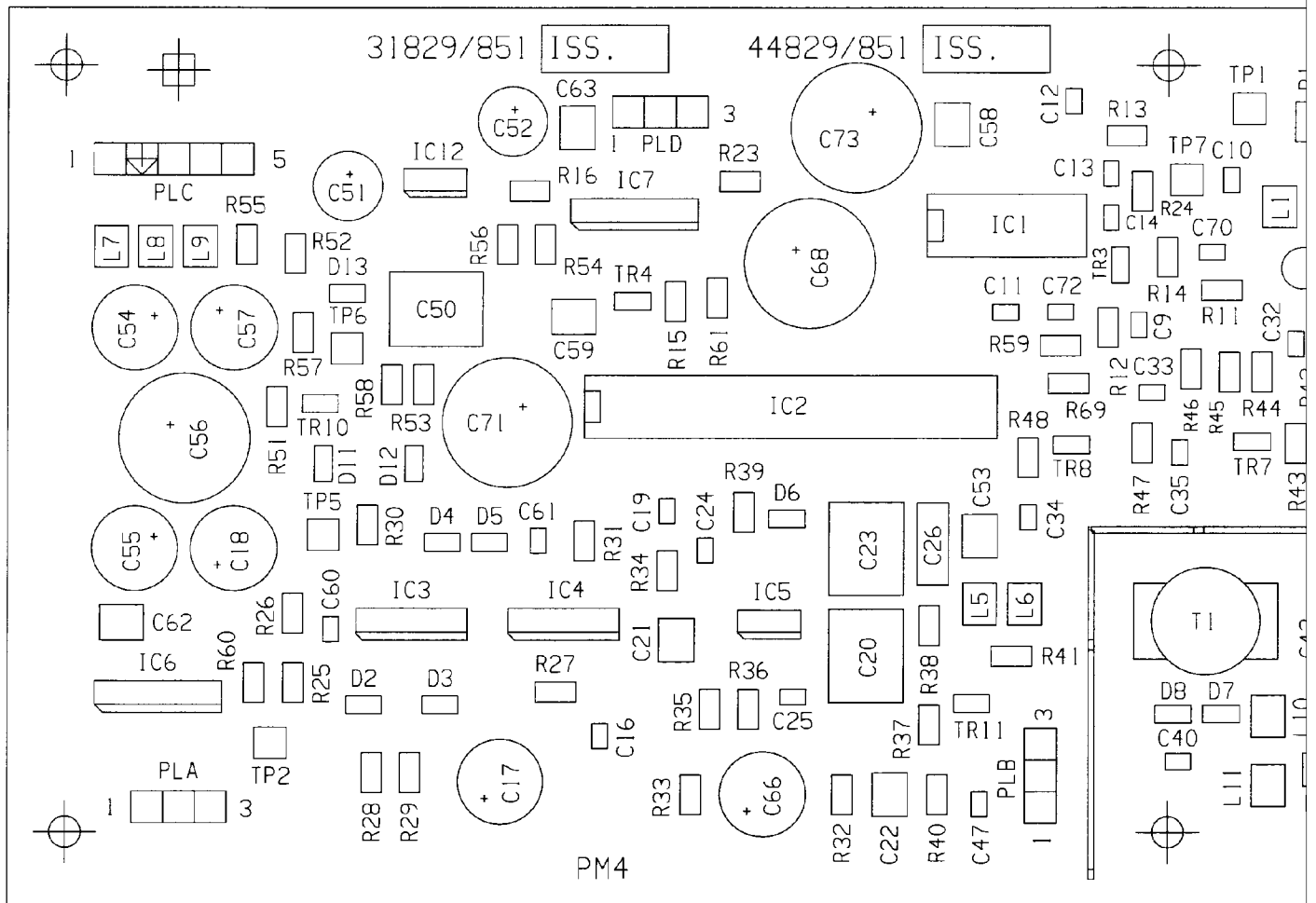
Circuit diagrams **AB4**

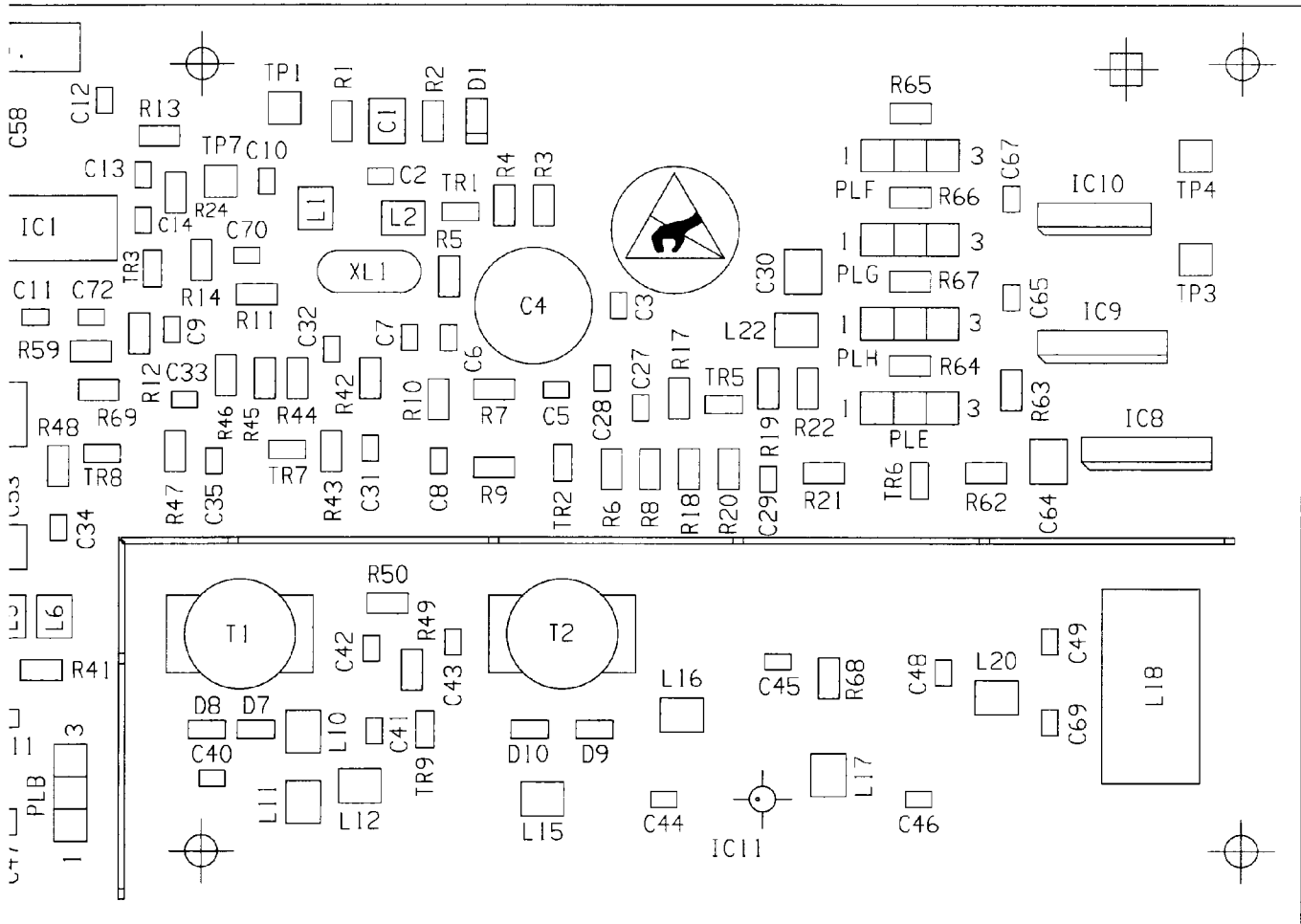
Fig. 7-183 AB4 Warp oscillator - circuit

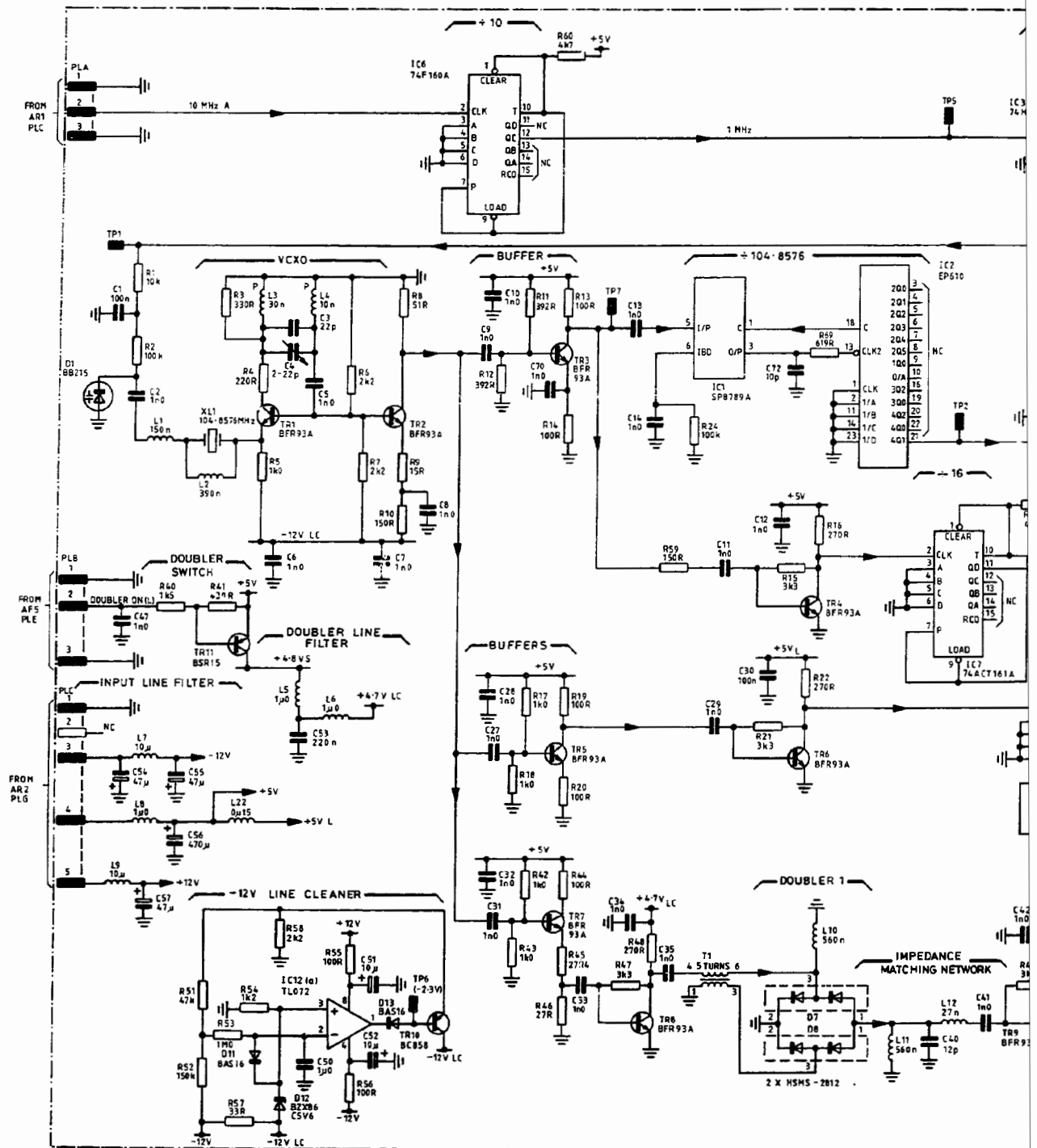


Warp oscillator **AB4**

Drg. No. 44829/851 Sh

# Component layout **AF1**





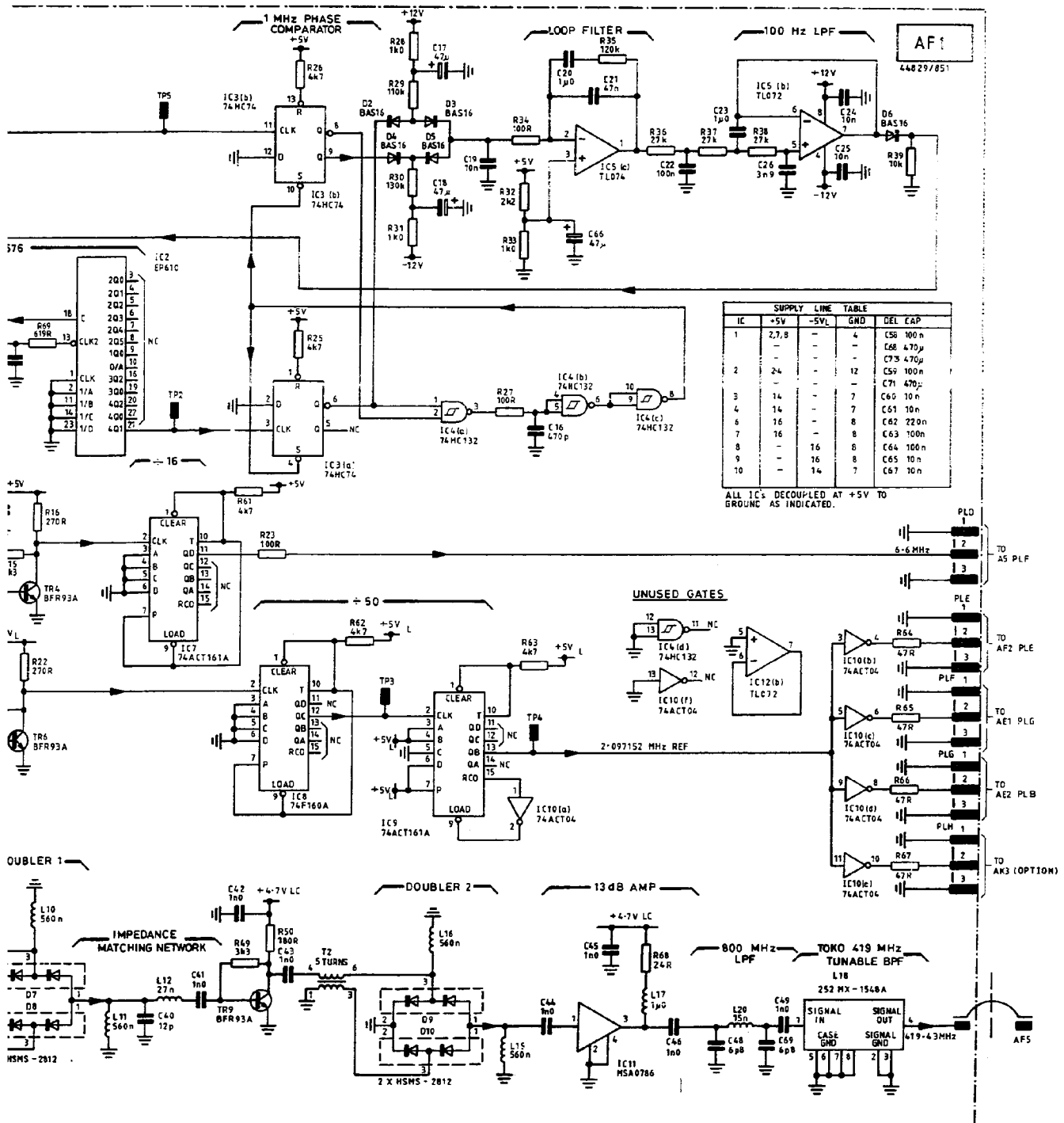
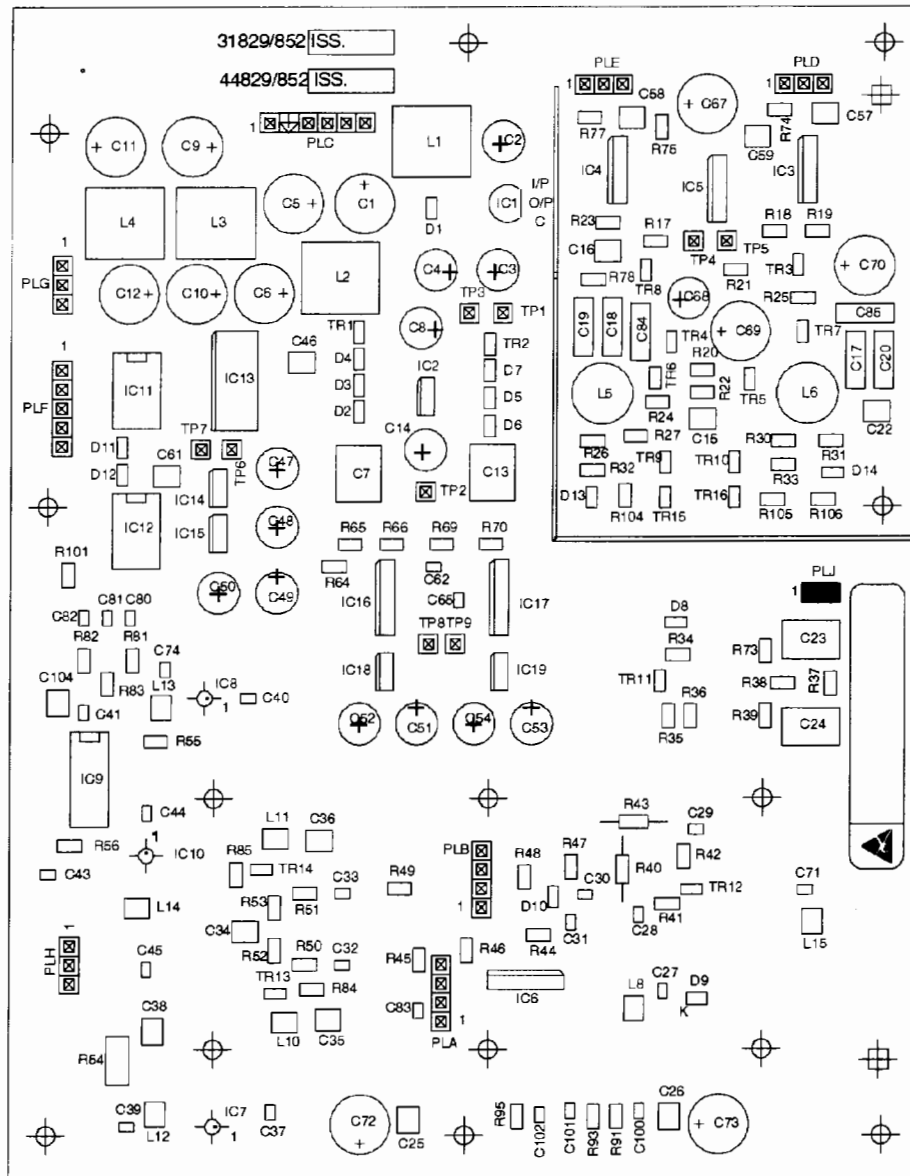
Circuit diagram **AF1**

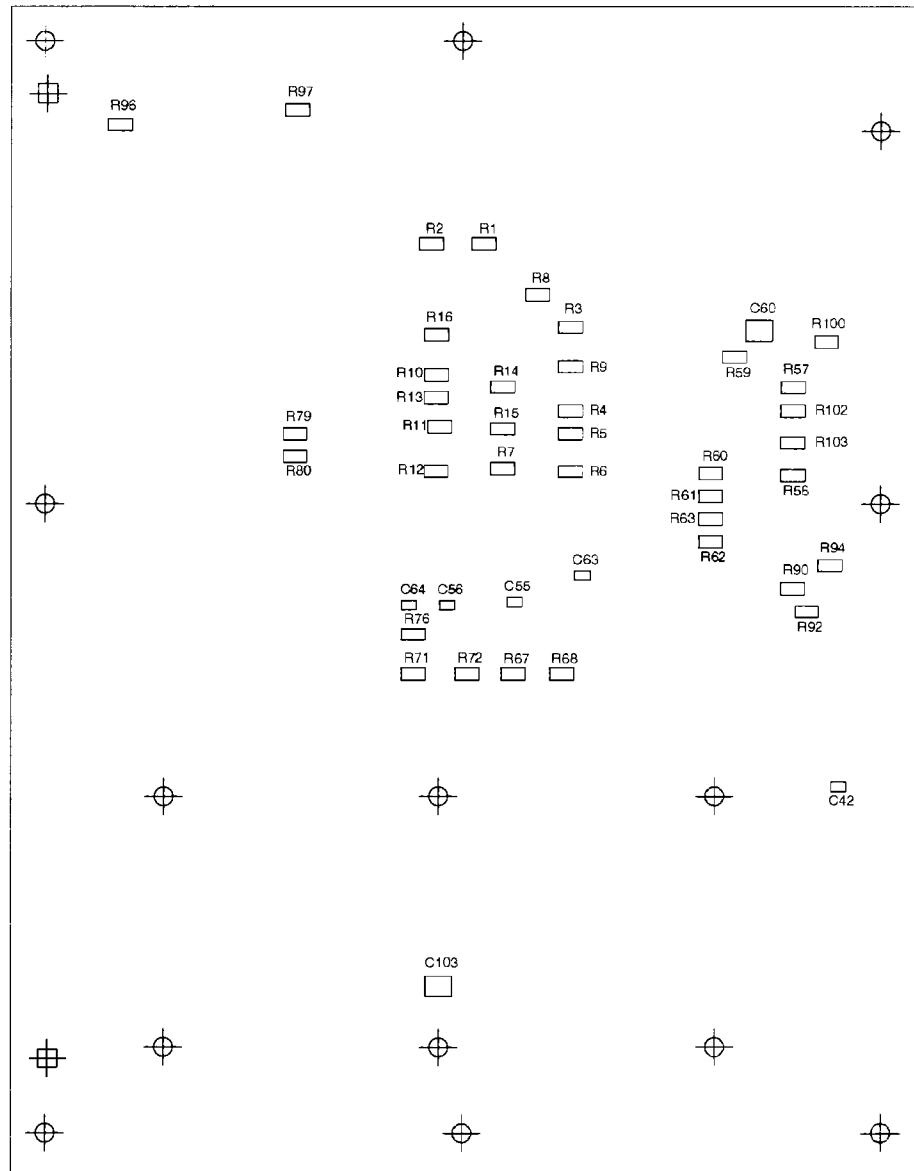
Fig. 7-185 AF1 VCXO and PLL - circuit

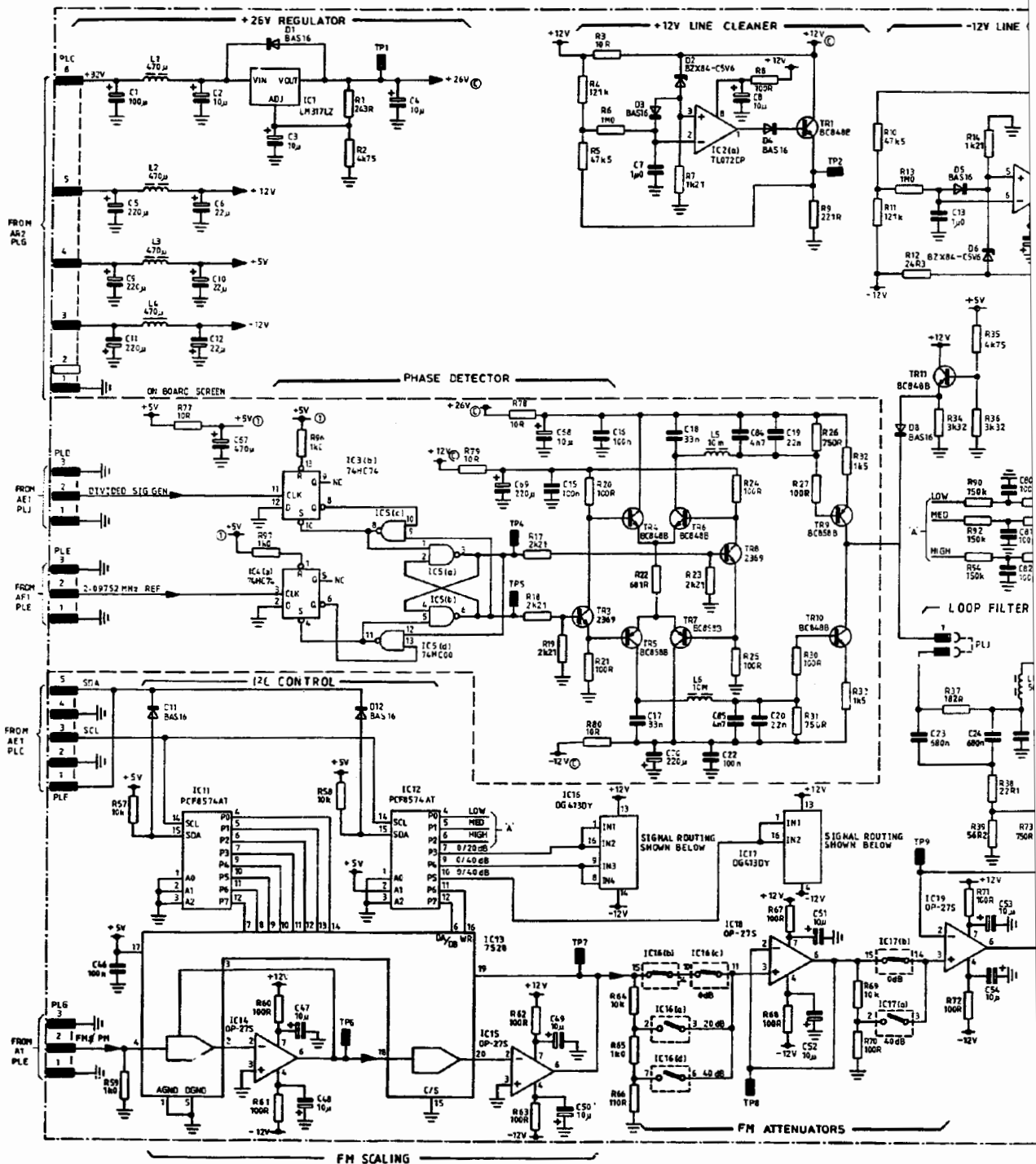


VCXO and PLL AF1

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## Component layout **AF2**







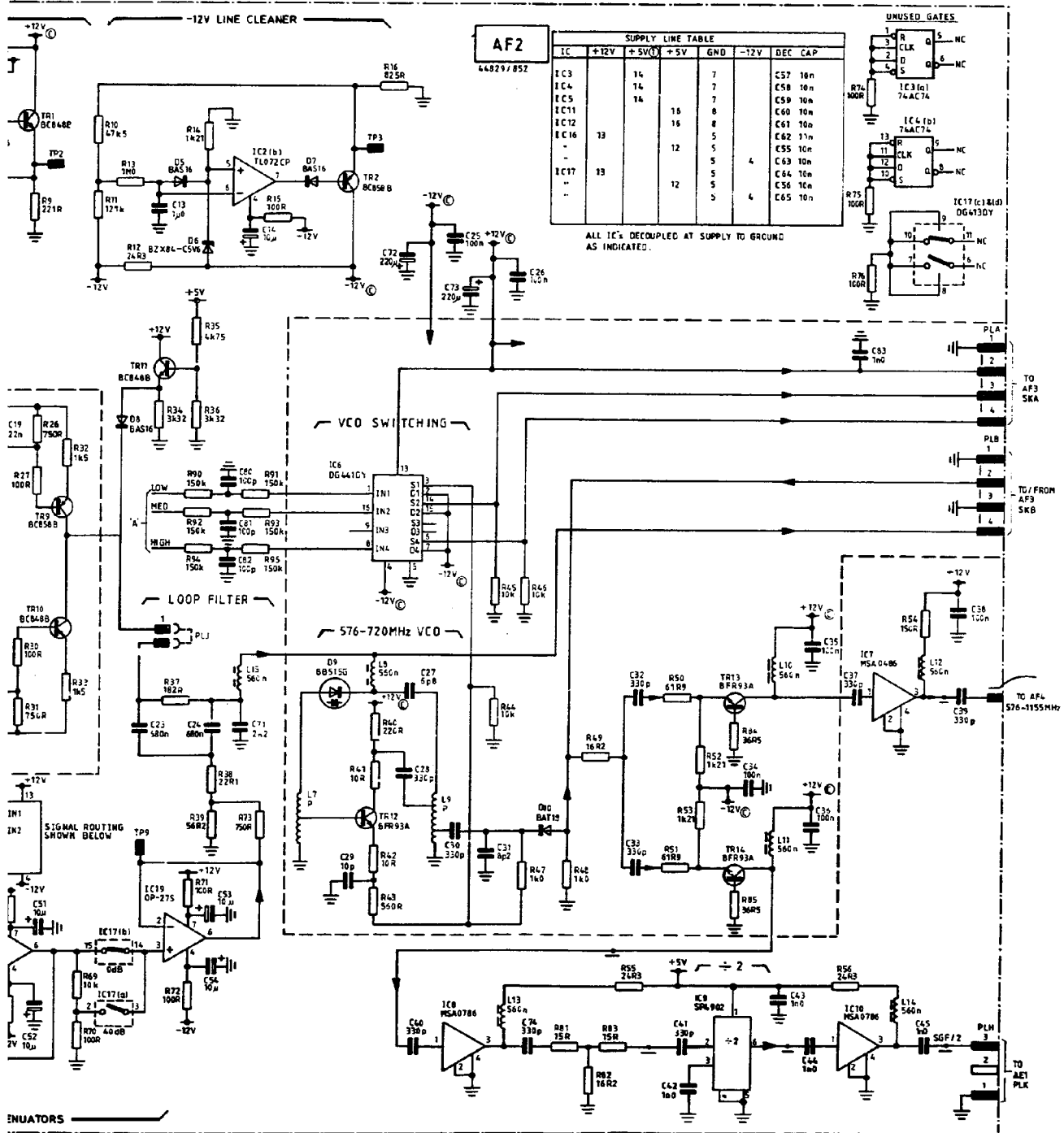
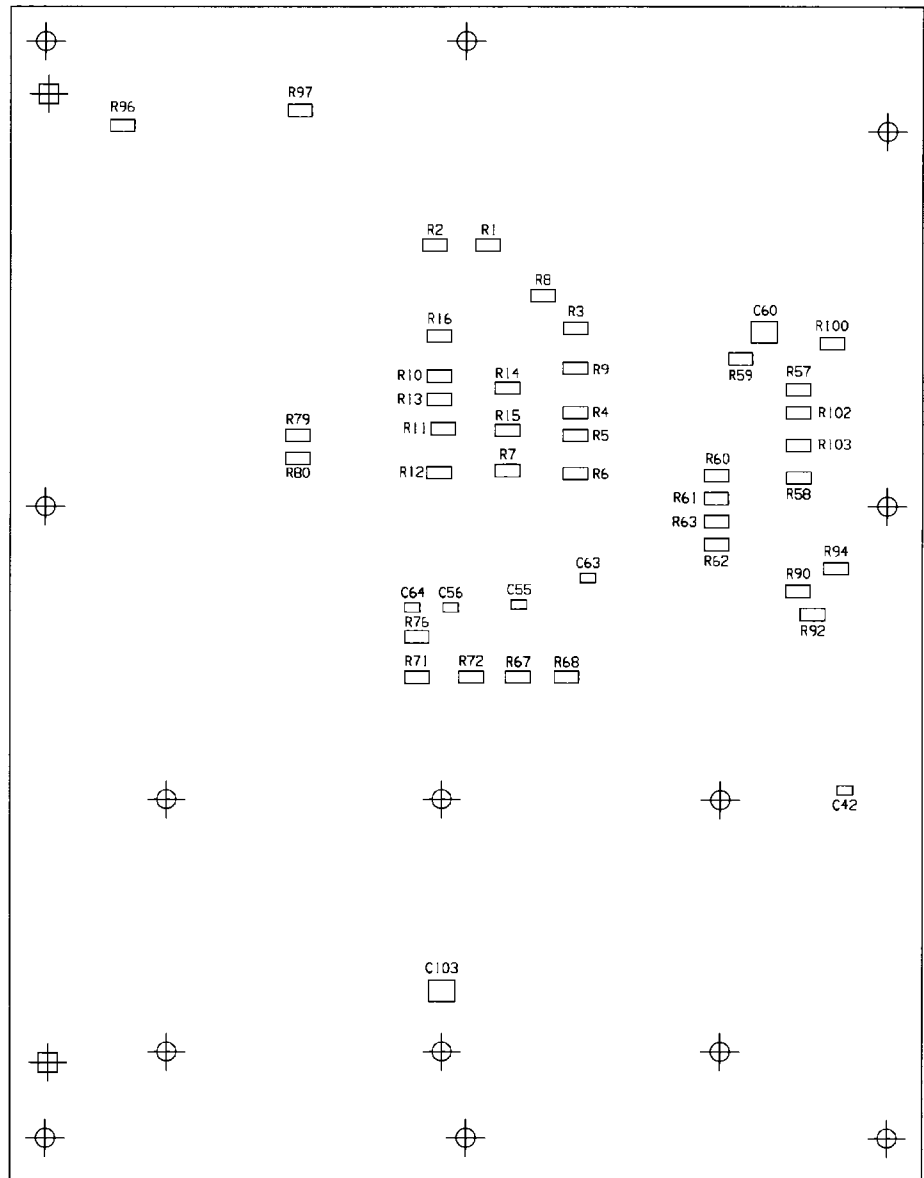
Circuit diagram **AF2 (earlier version)**

Fig. 7-187 AF2 RF oscillator (earlier version) - circuit



## Component layout **AF2**



**AF2**

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Fig. 7-188 AF2 RF oscillator (later version) - component layout

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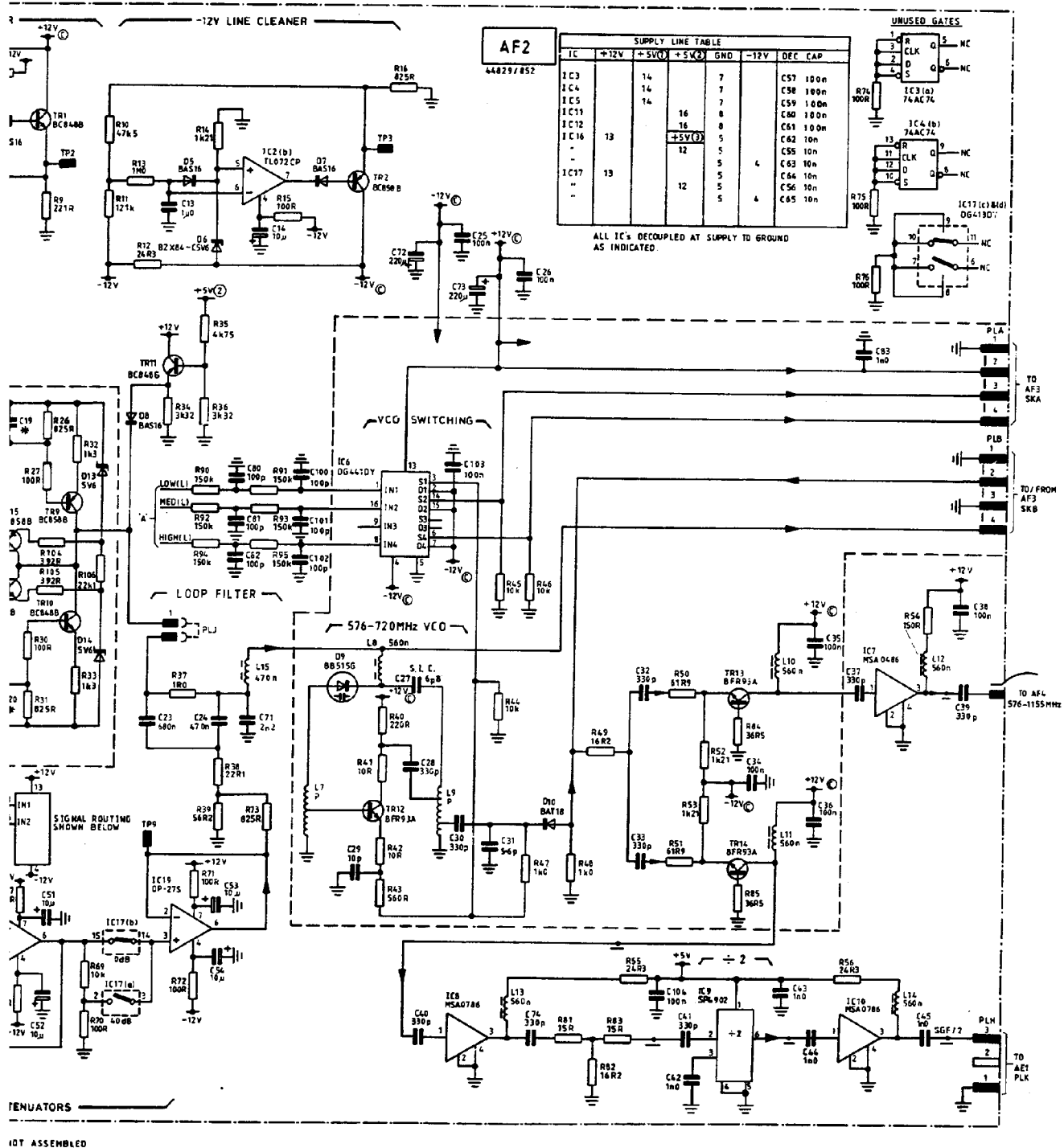
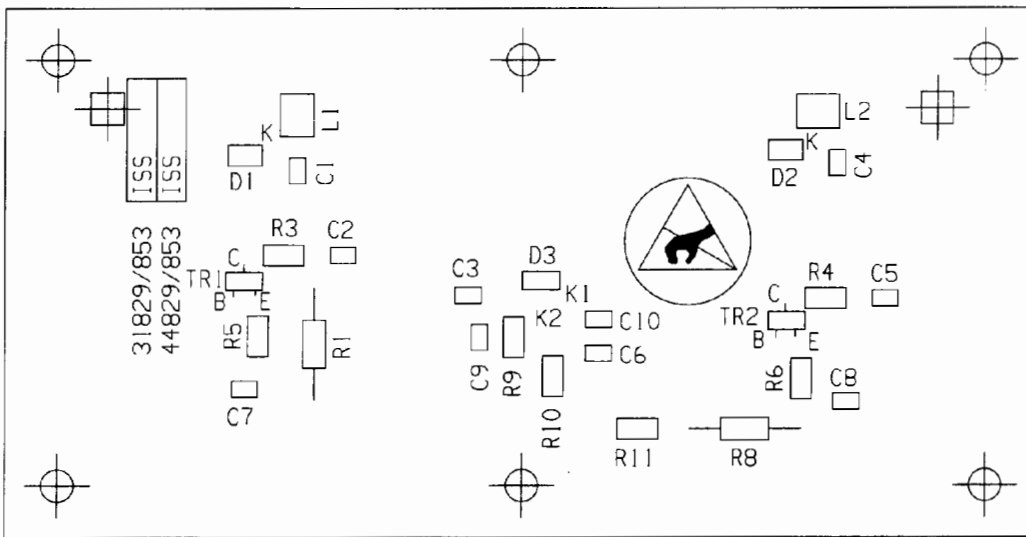
Circuit diagram **AF2 (later version)**

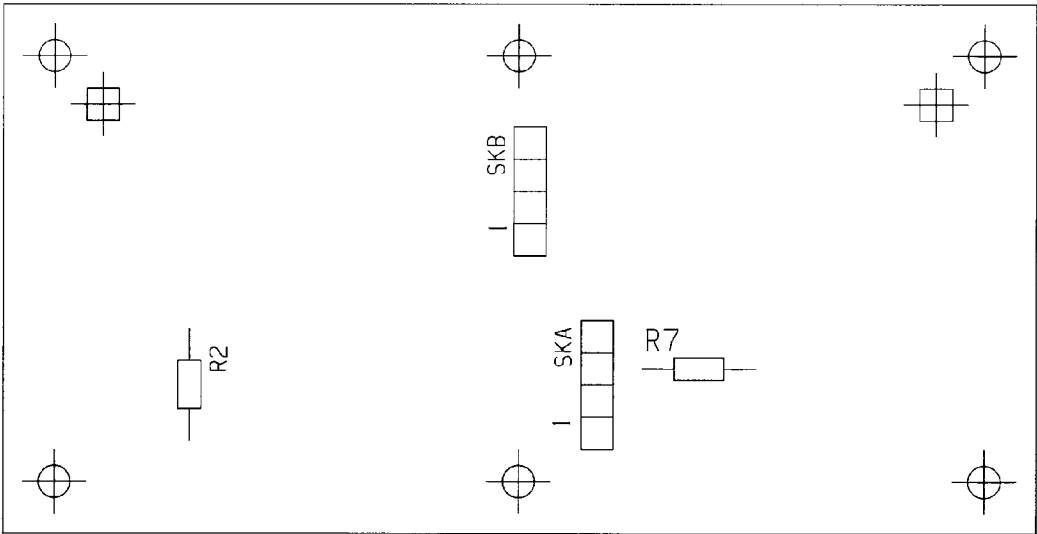
Fig. 7-189 AF2 RF oscillator (later version) - circuit



RF oscillator (later version) **AF2**

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Component layout **AF3**



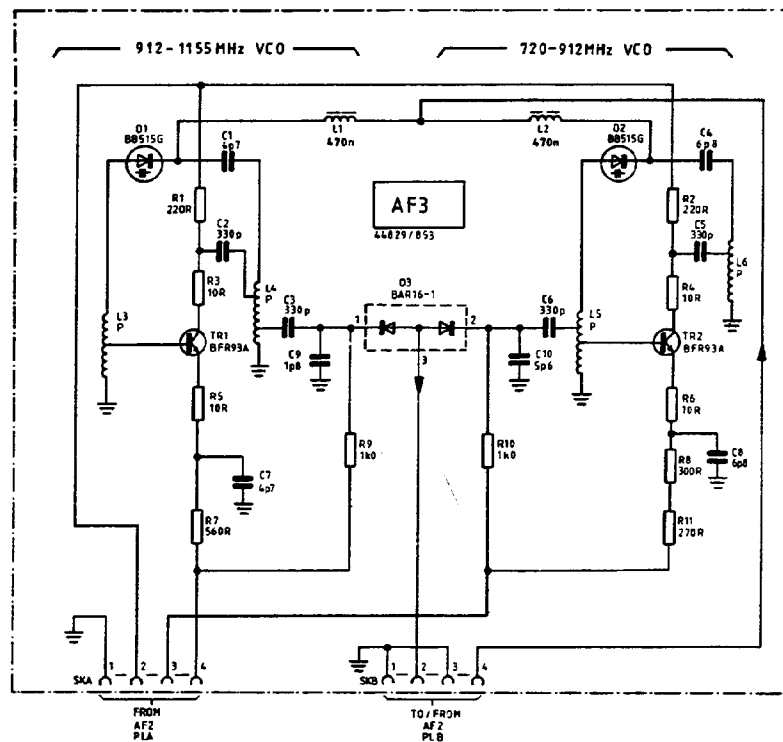
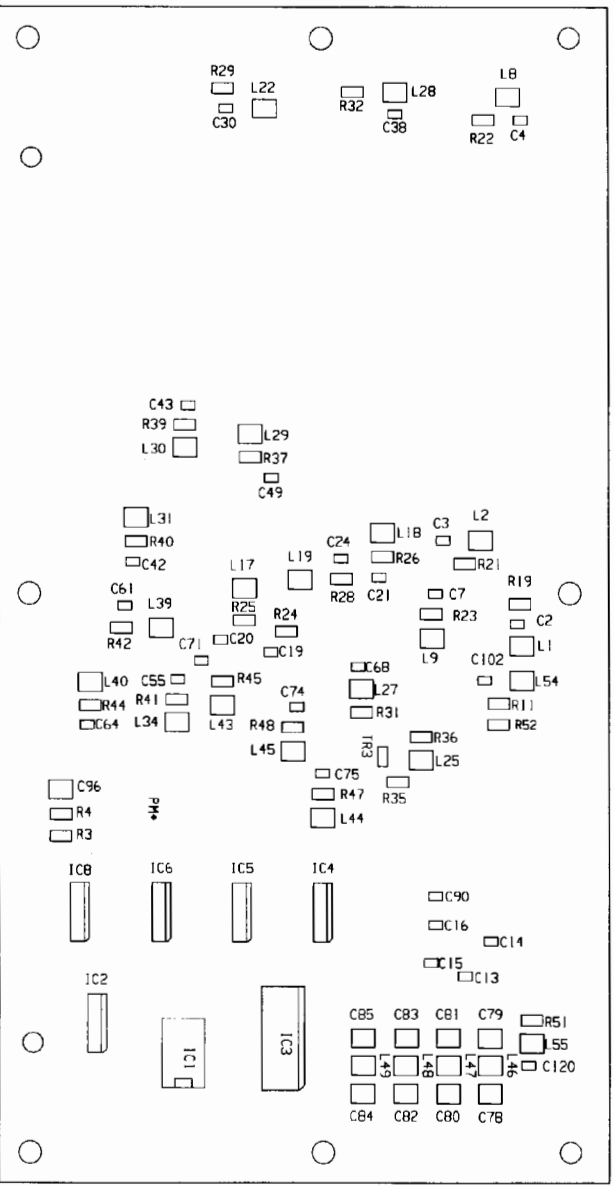
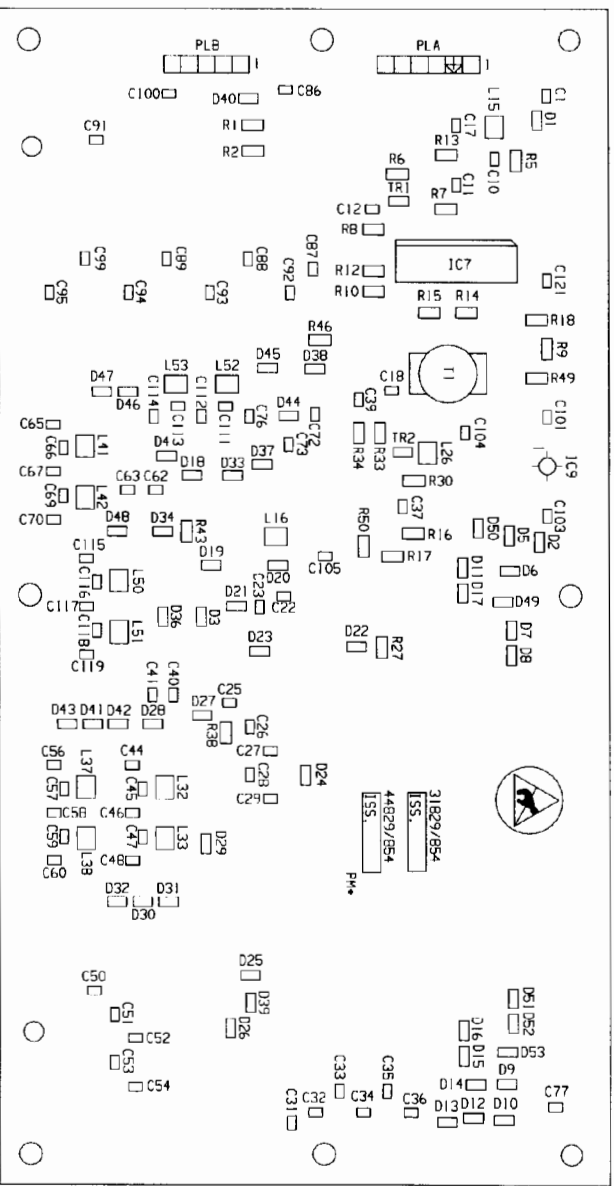
Circuit diagram **AF3**

Fig. 7-191 AF3 VCO - circuit



# Component layout AF4

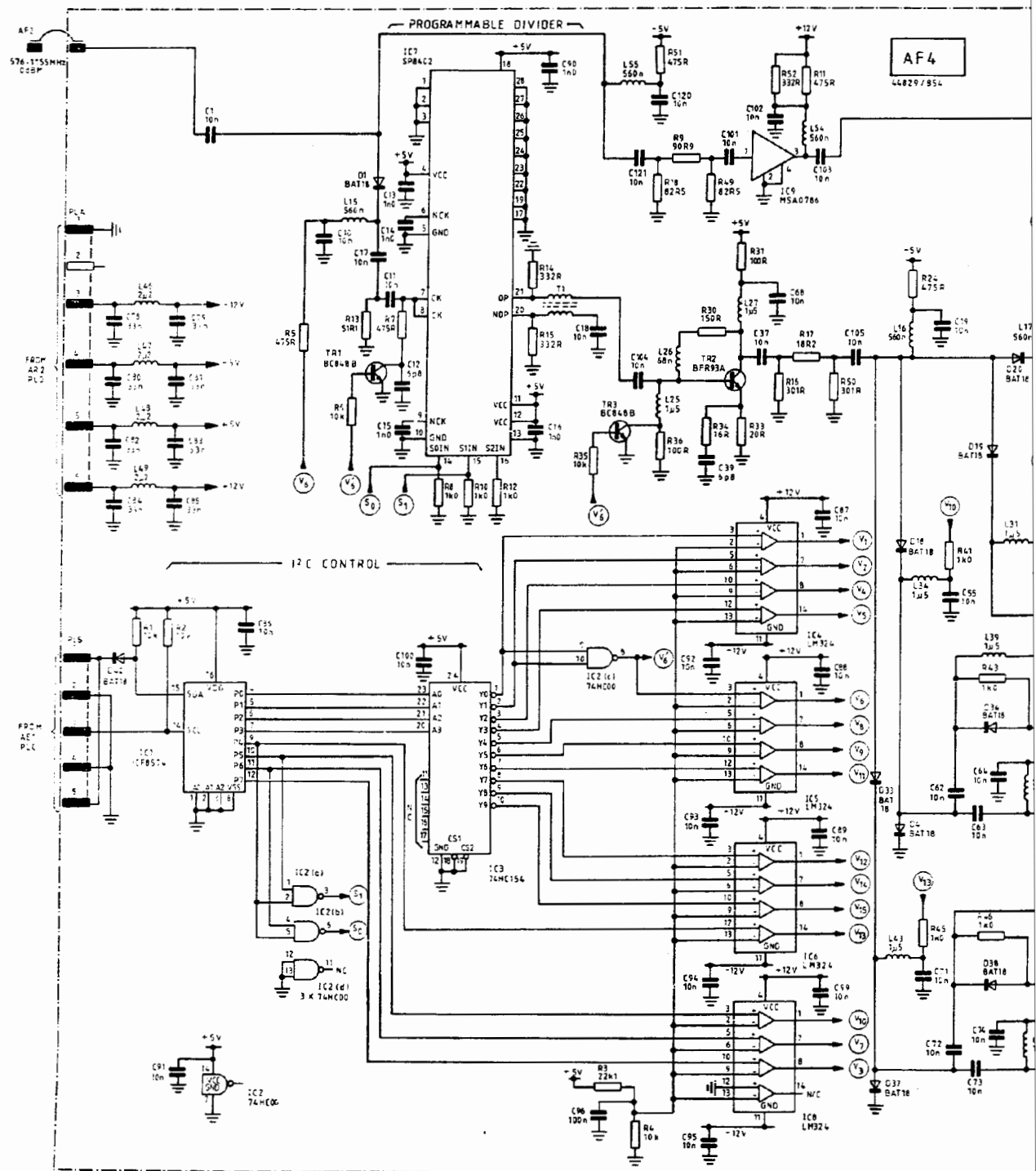


F3

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Fig. 7-192 AF4 RF divider - component layout

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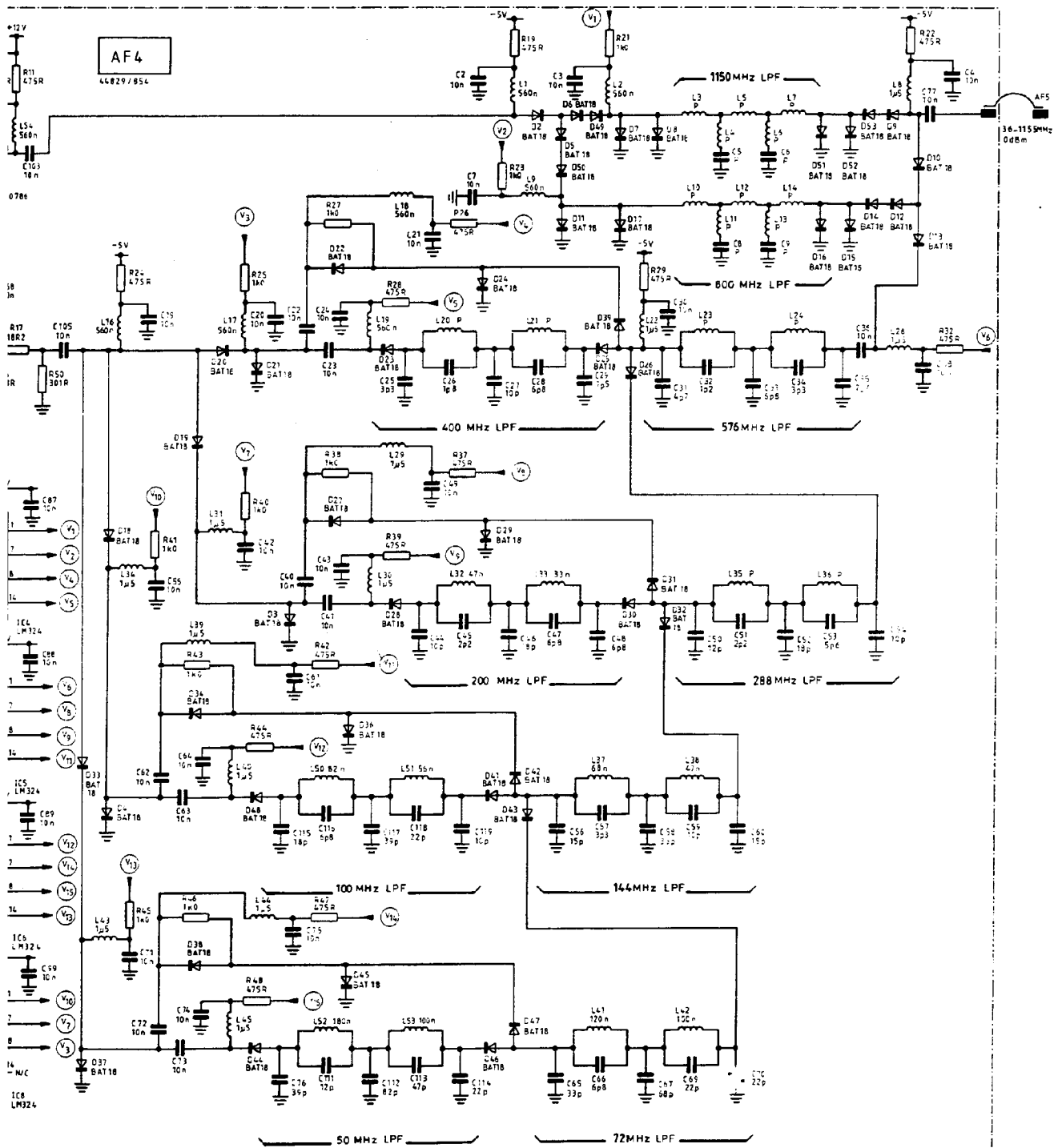
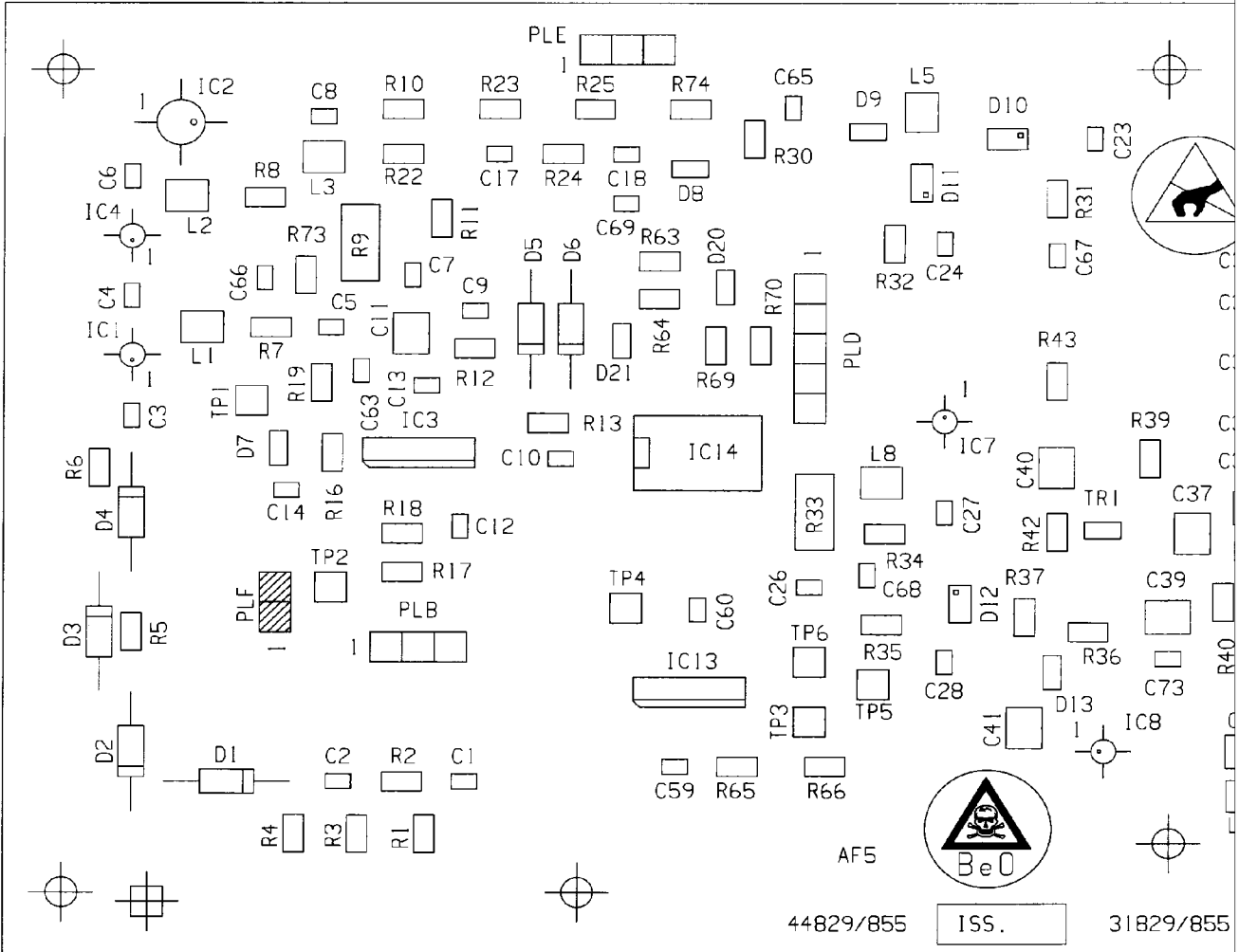
Circuit diagram **AF4**

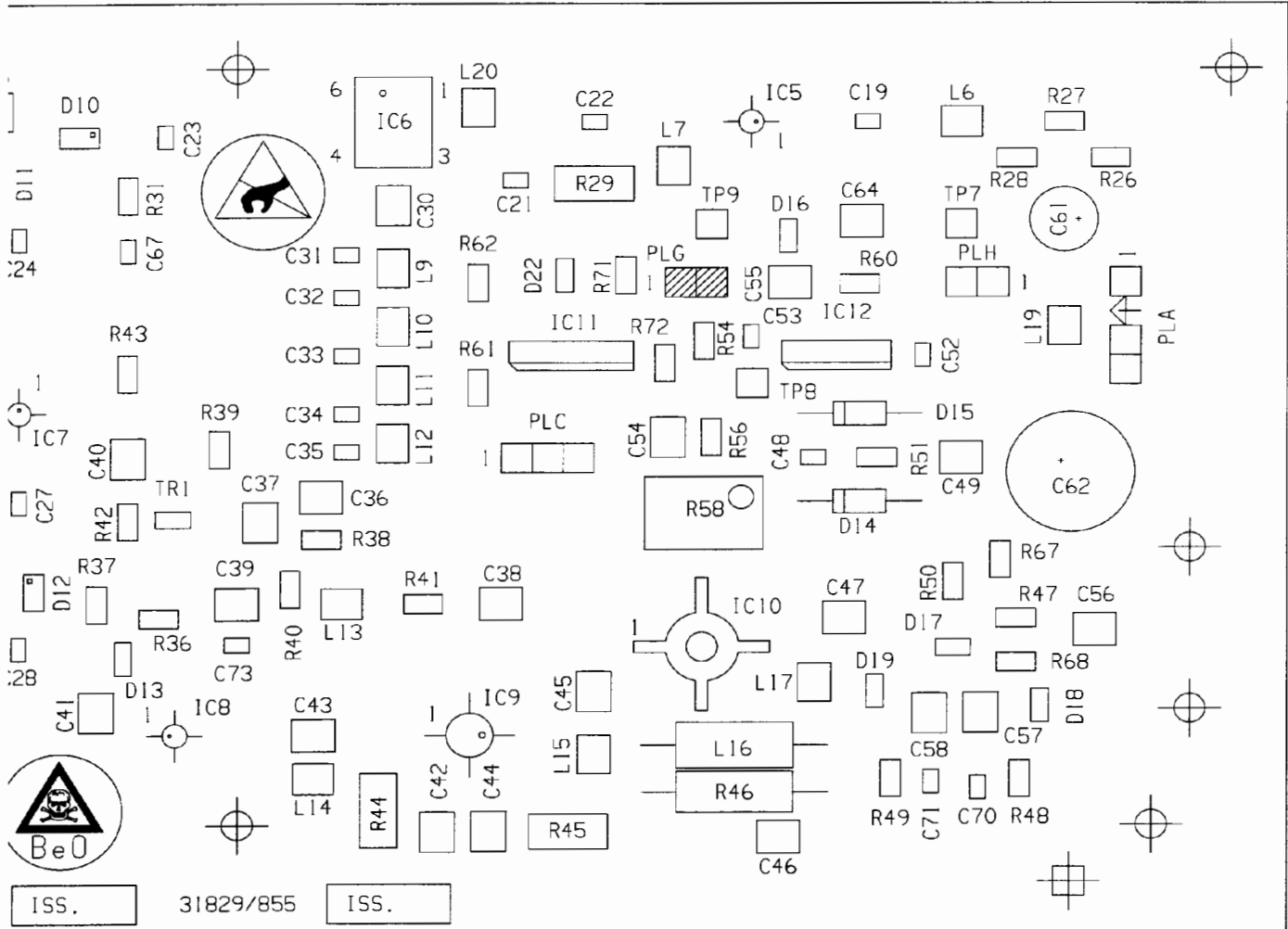
Fig. 7-193 AF4 RF divider - circuit



RF divider **AF4**

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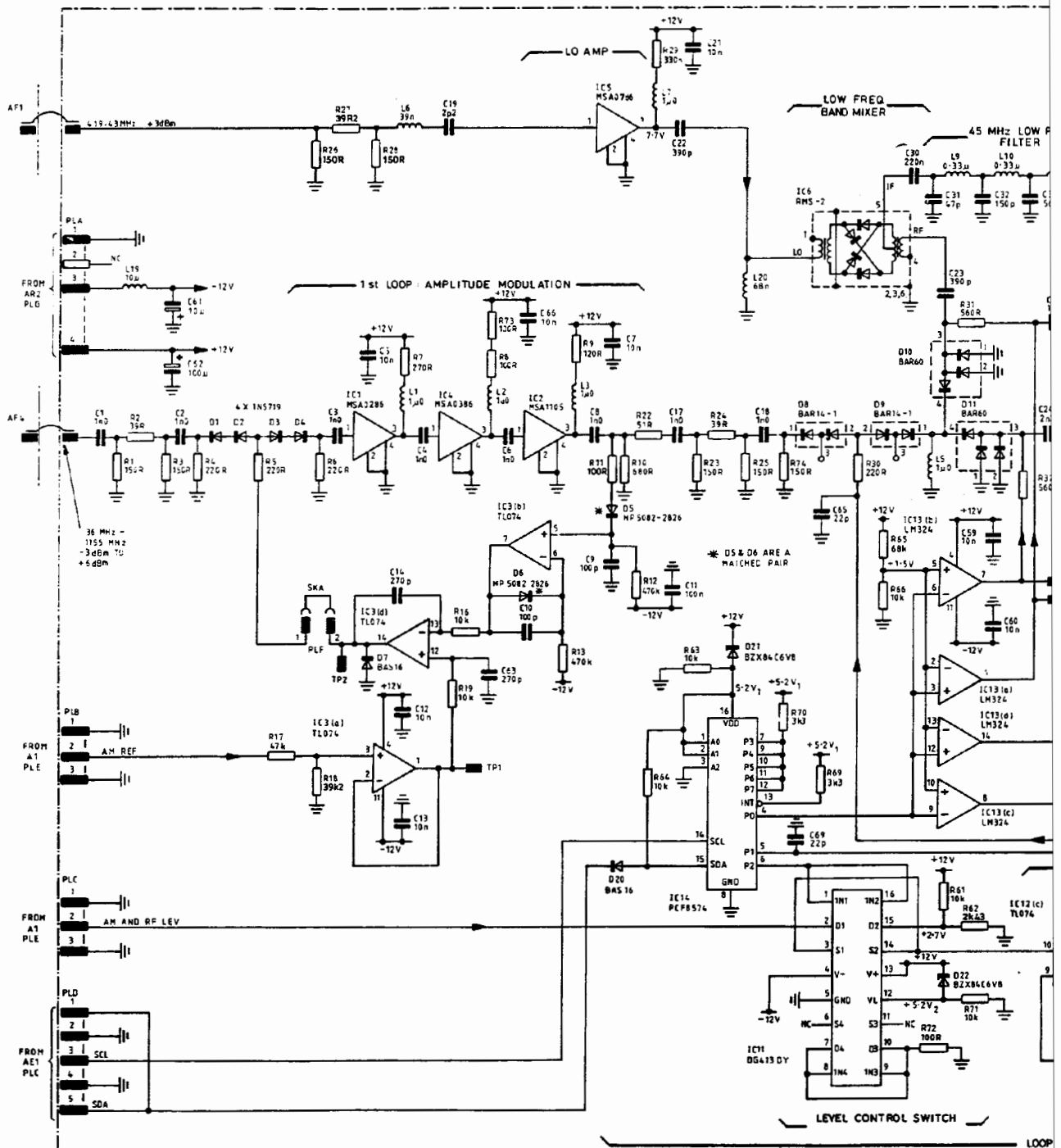
## Component layout **AF5**

**AF4**

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*Fig. 7-194 AF5 RF output - component layout*

46882-168



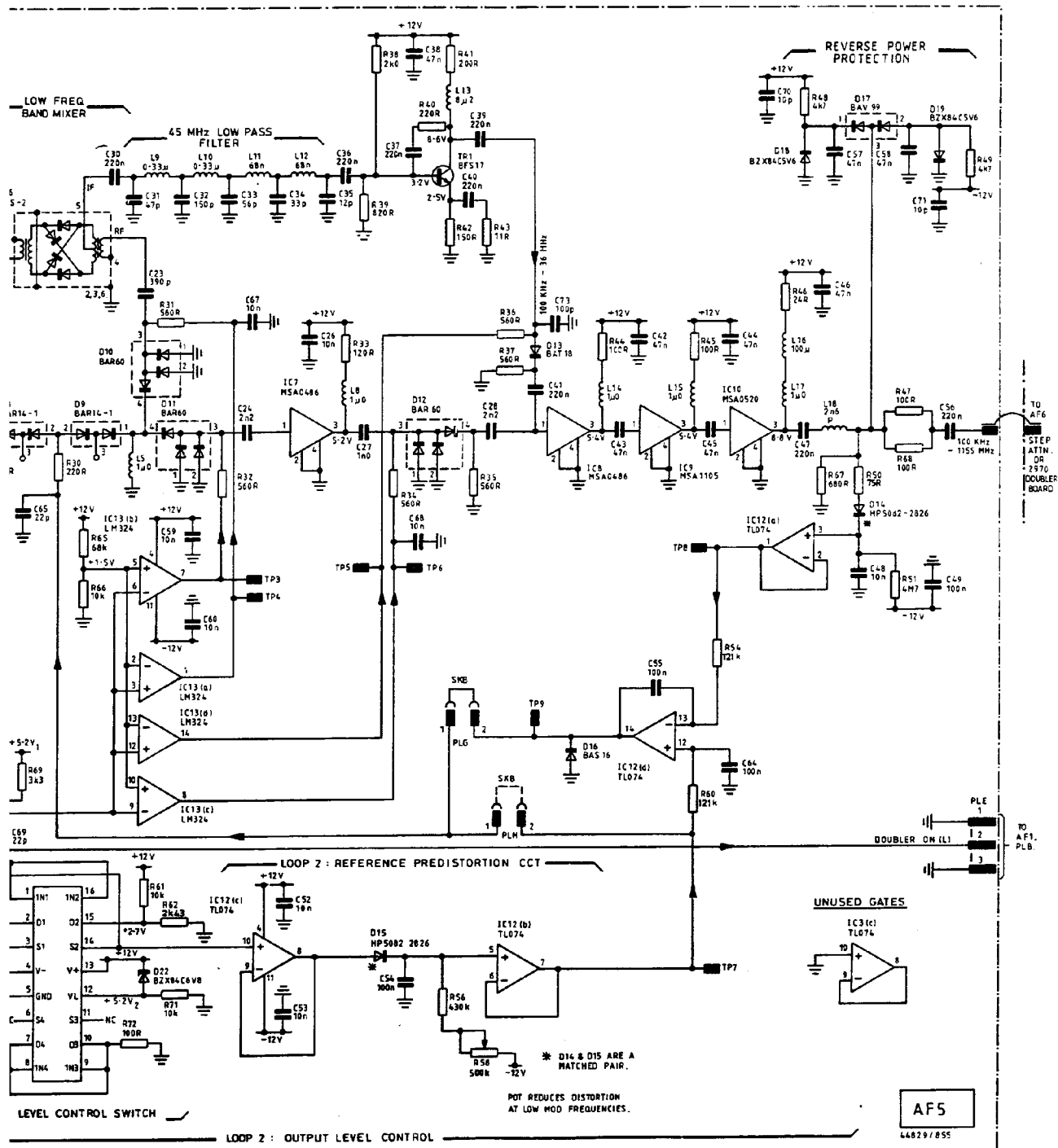
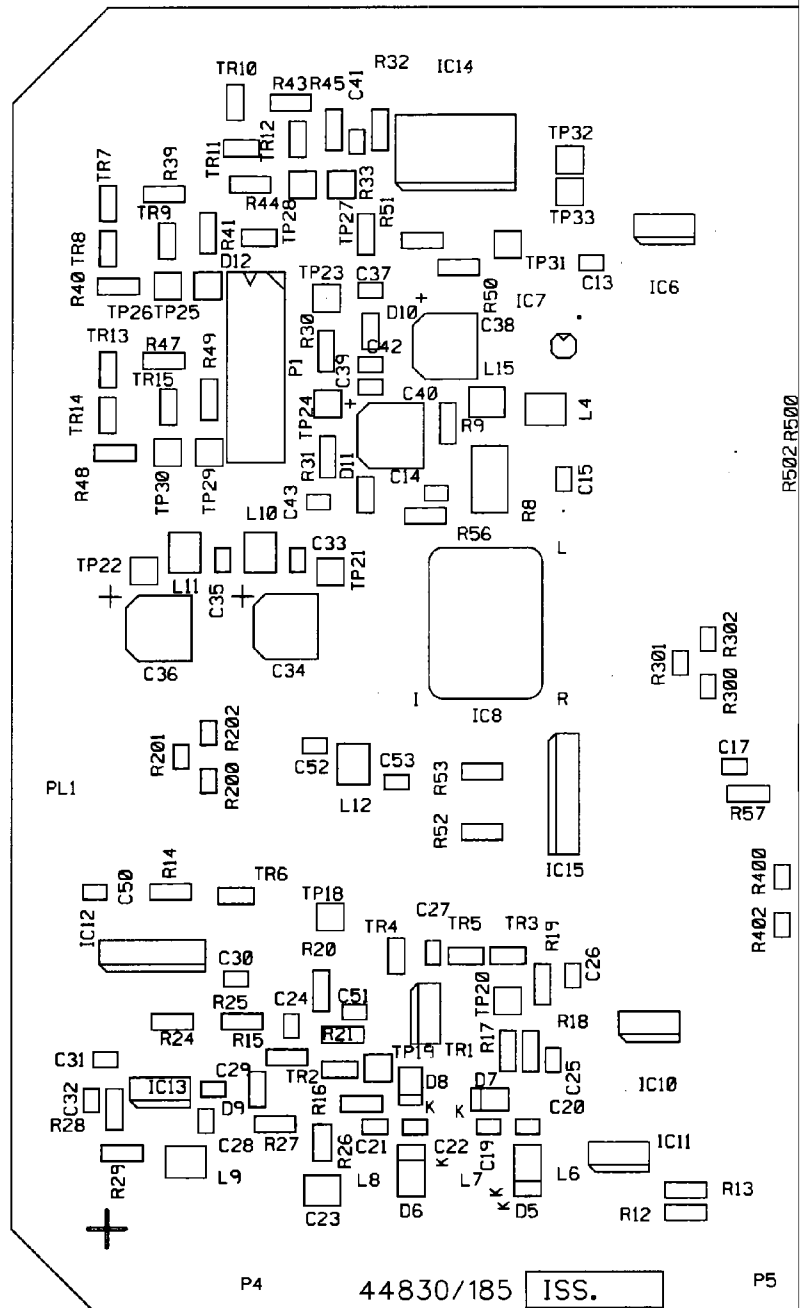
Circuit diagram **AF5**

Fig. 7-195 AF5 RF output - circuit

# SERVICING DIAGRAMS

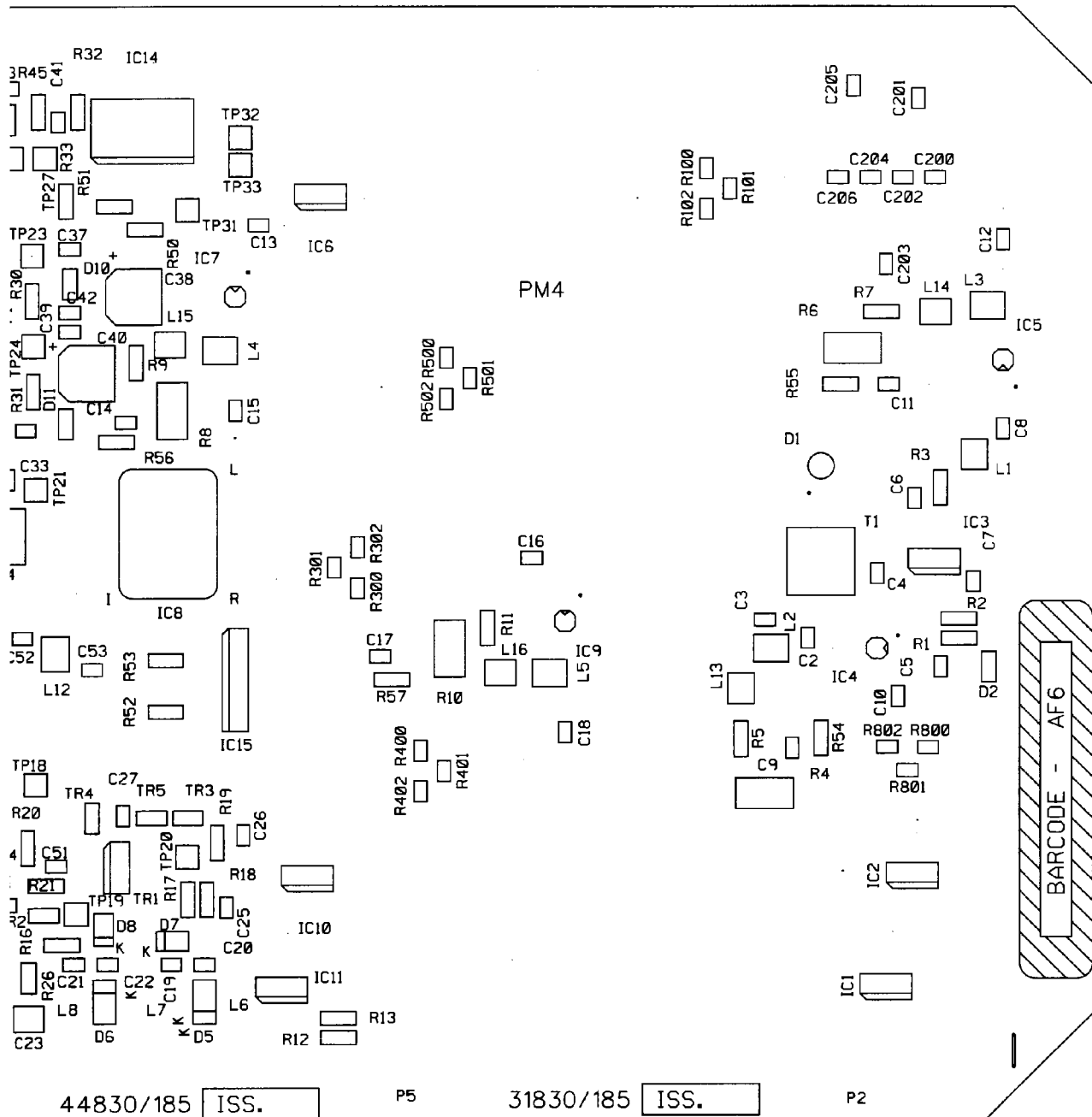


RF output **AF5**

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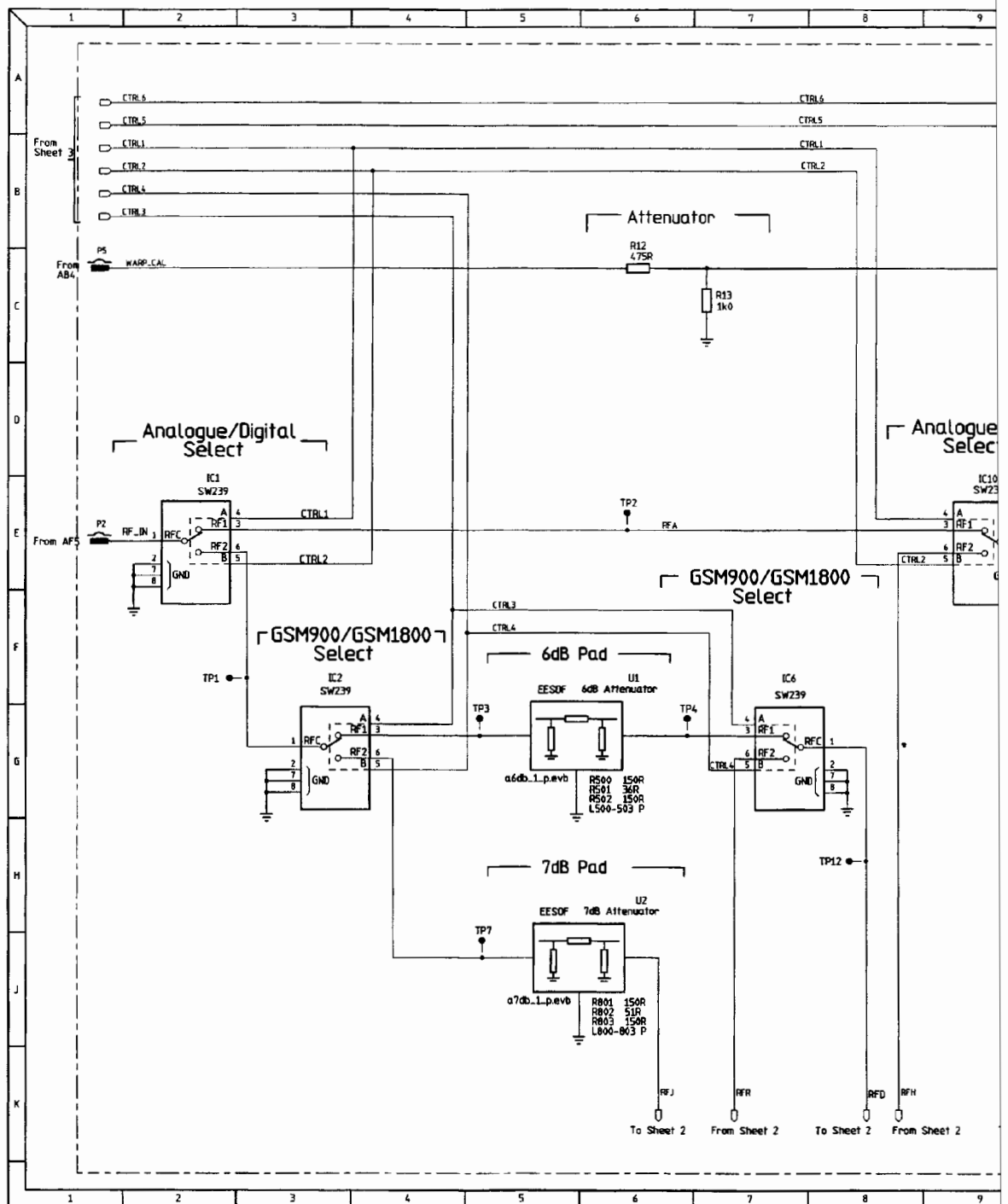
# Component layout AF6



AF5

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Fig. 7-196 AF6 Up convertor - component layout



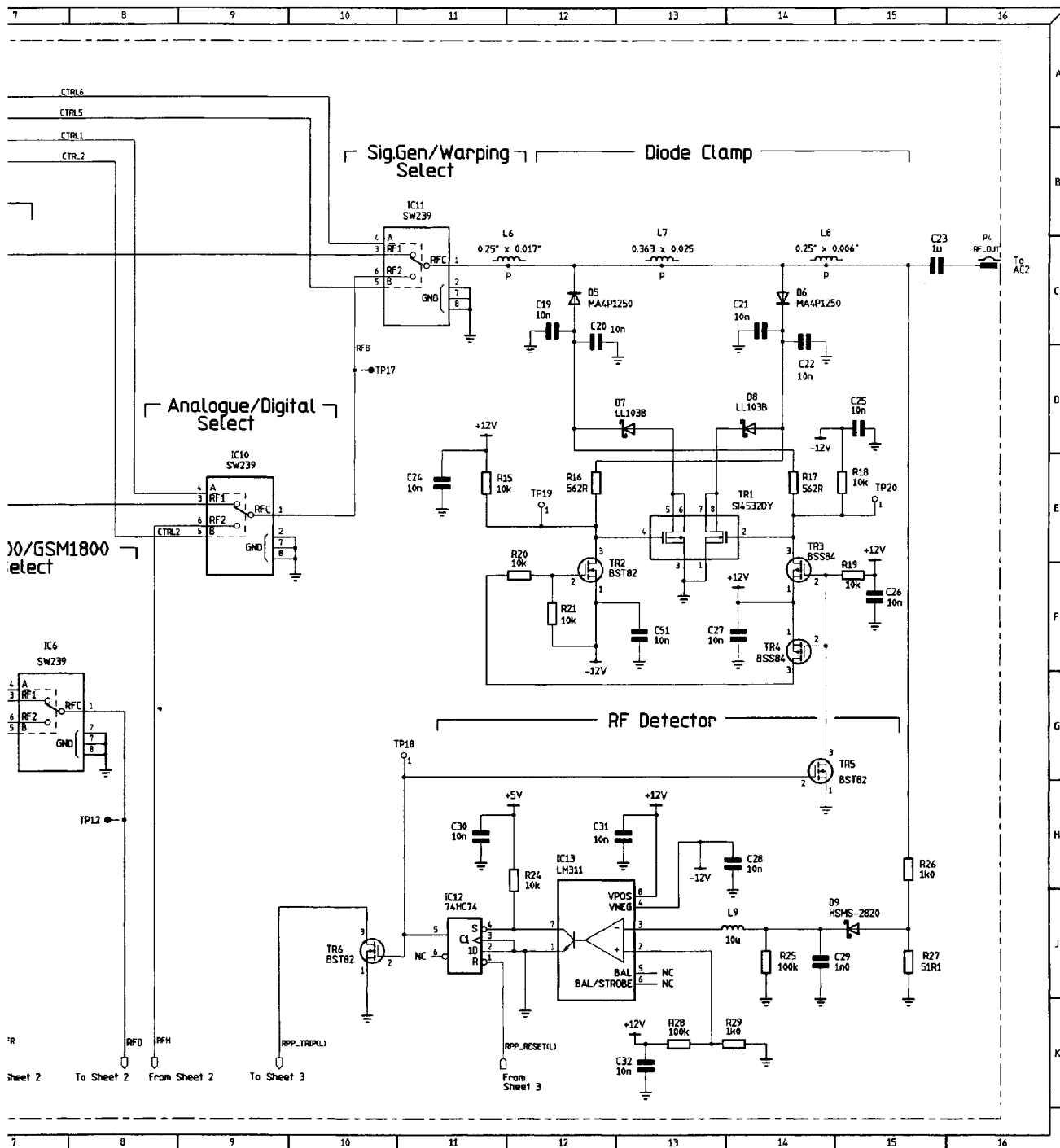
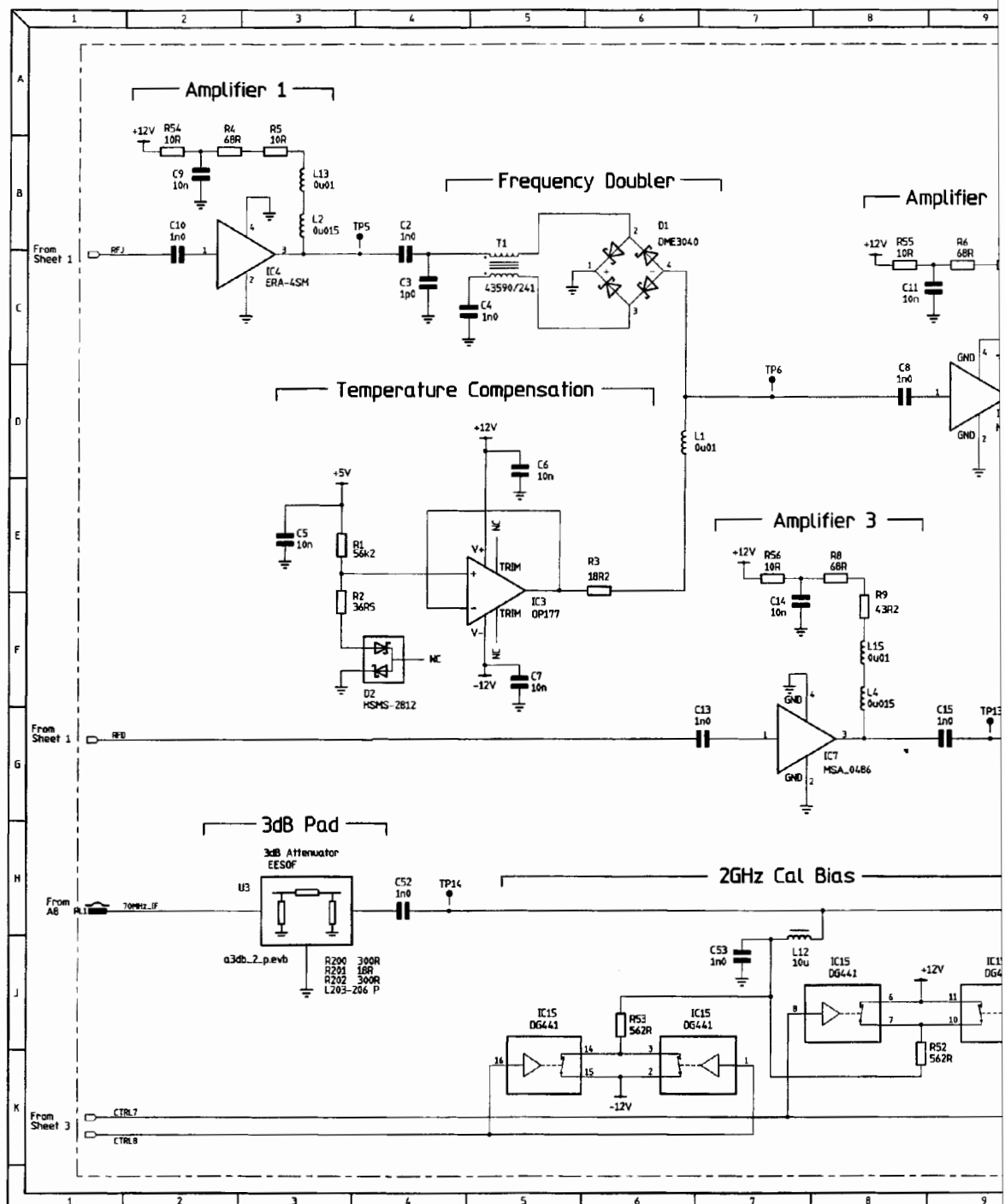
Circuit diagrams **AF6**

Fig. 7-197 AF6 Up convertor - circuit



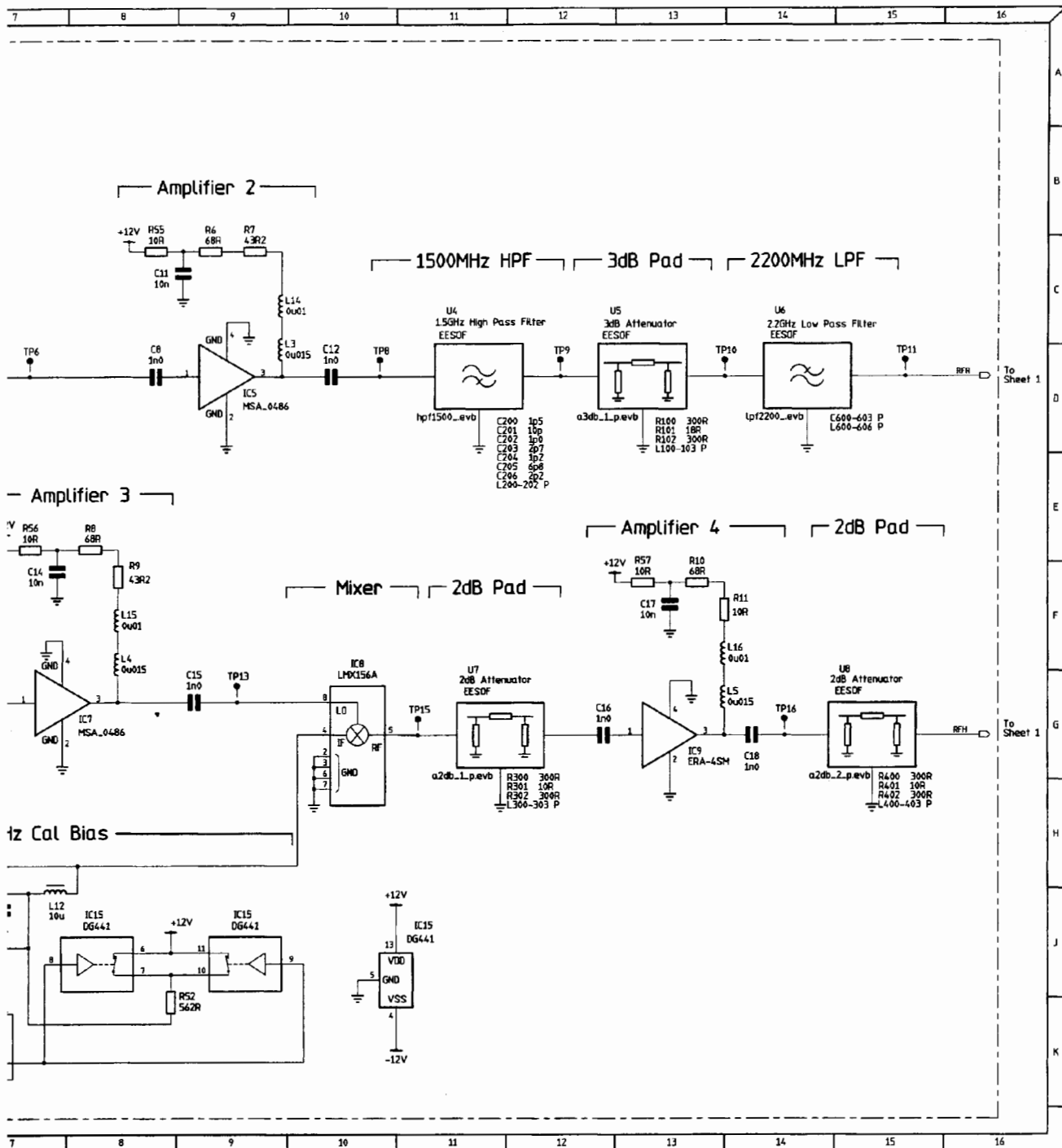
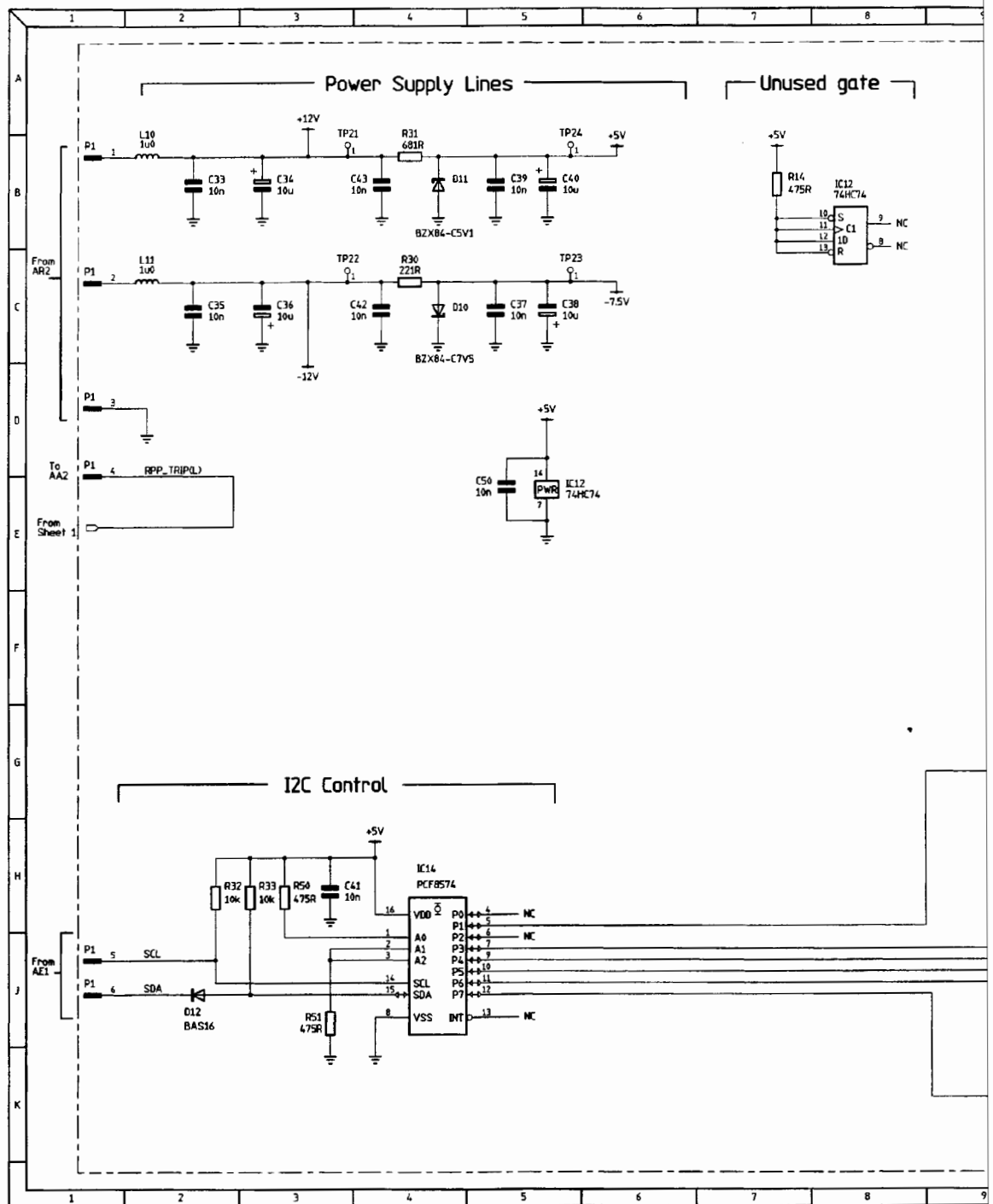
Circuit diagrams **AF6**

Fig. 7-198 AF6 Up convertor - circuit



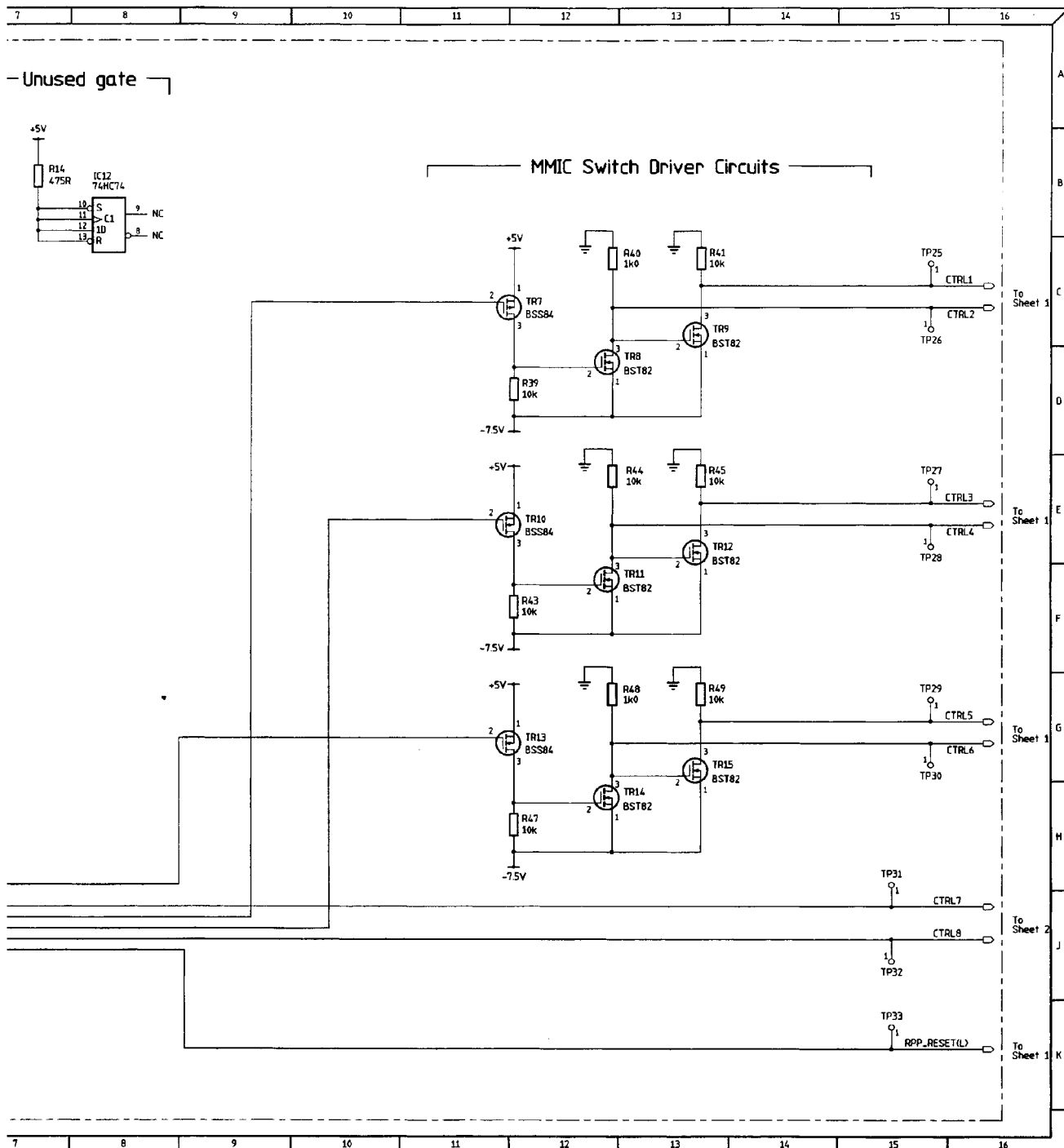
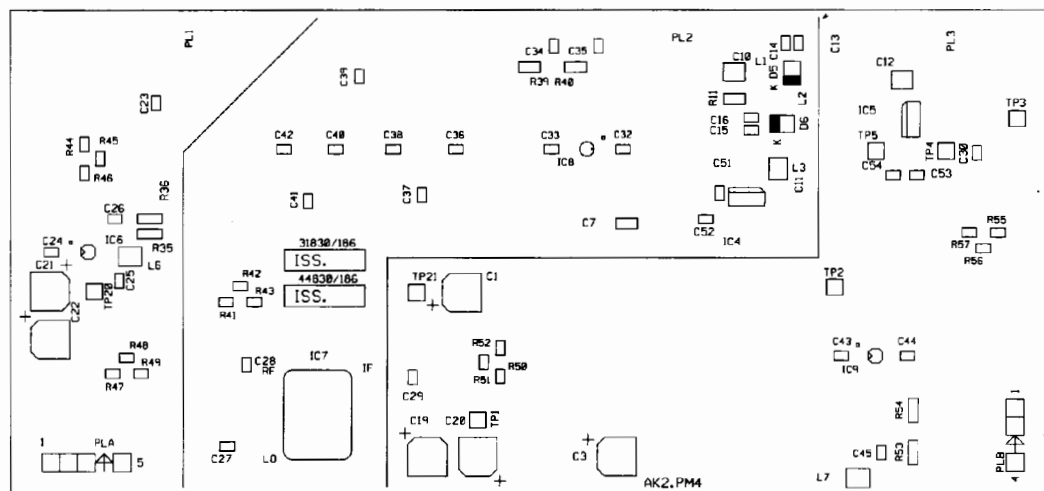
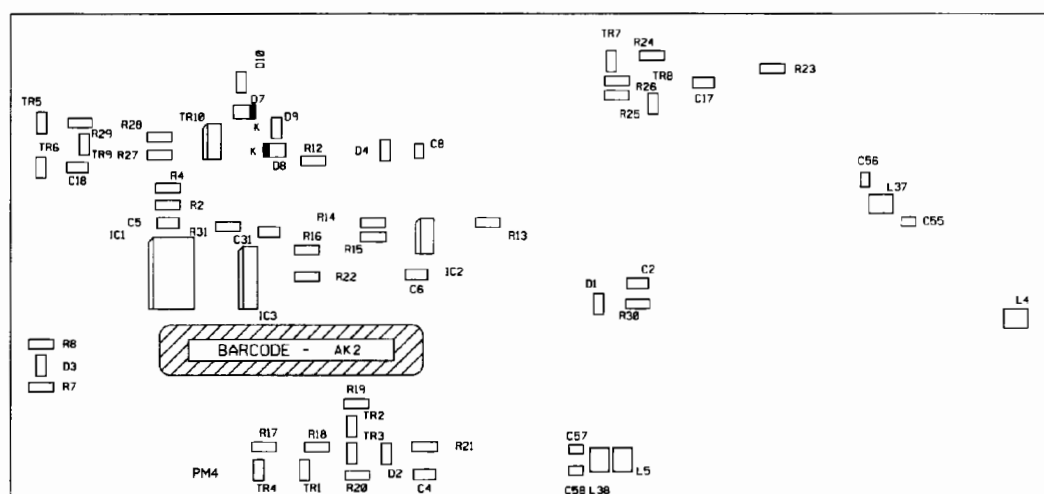
Circuit diagrams **AF6**

Fig. 7-199 AF6 Up convertor - circuit

## Component layout **AK2**

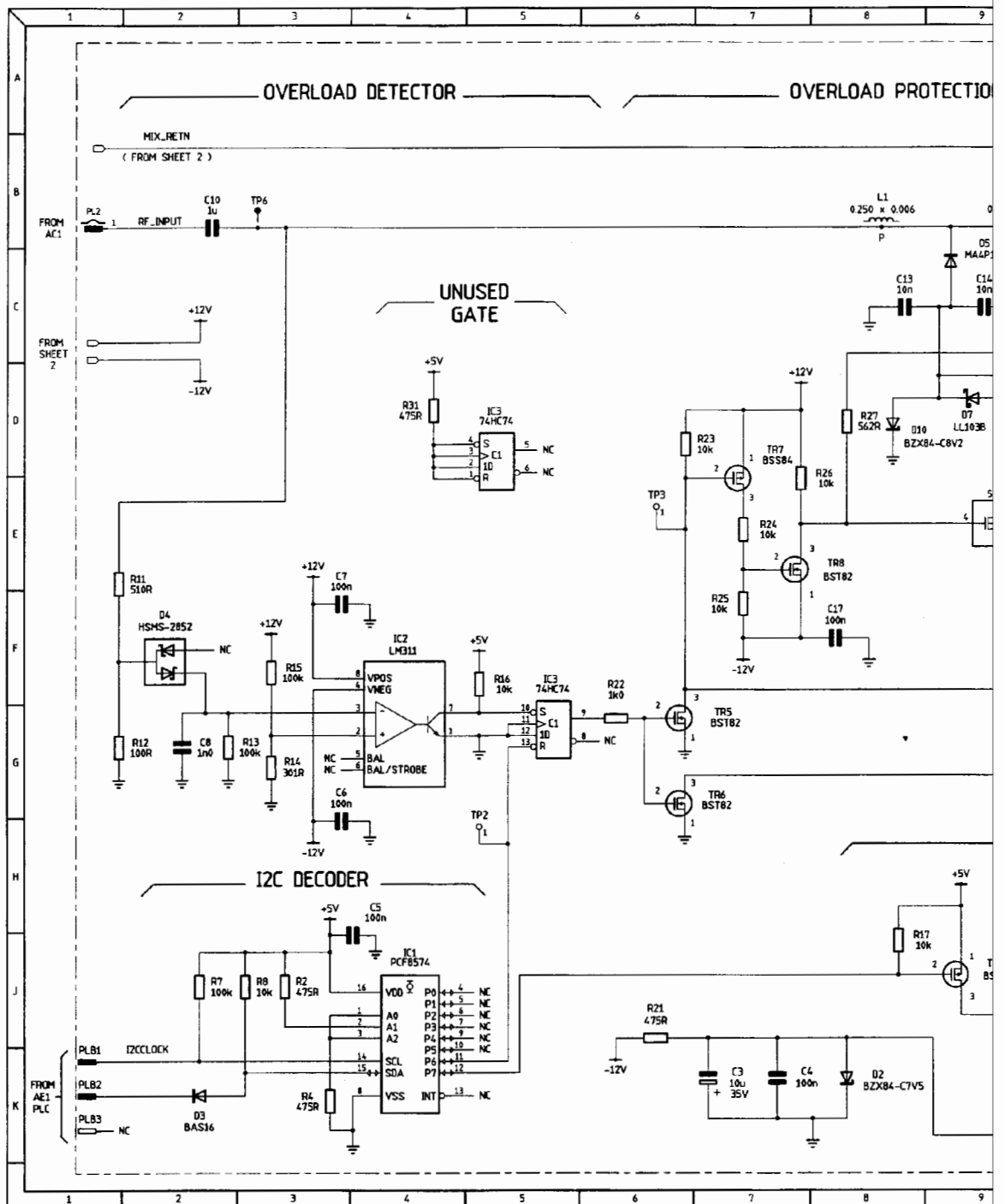


COMPONENT SIDE VIEW



SOLDER SIDE VIEW





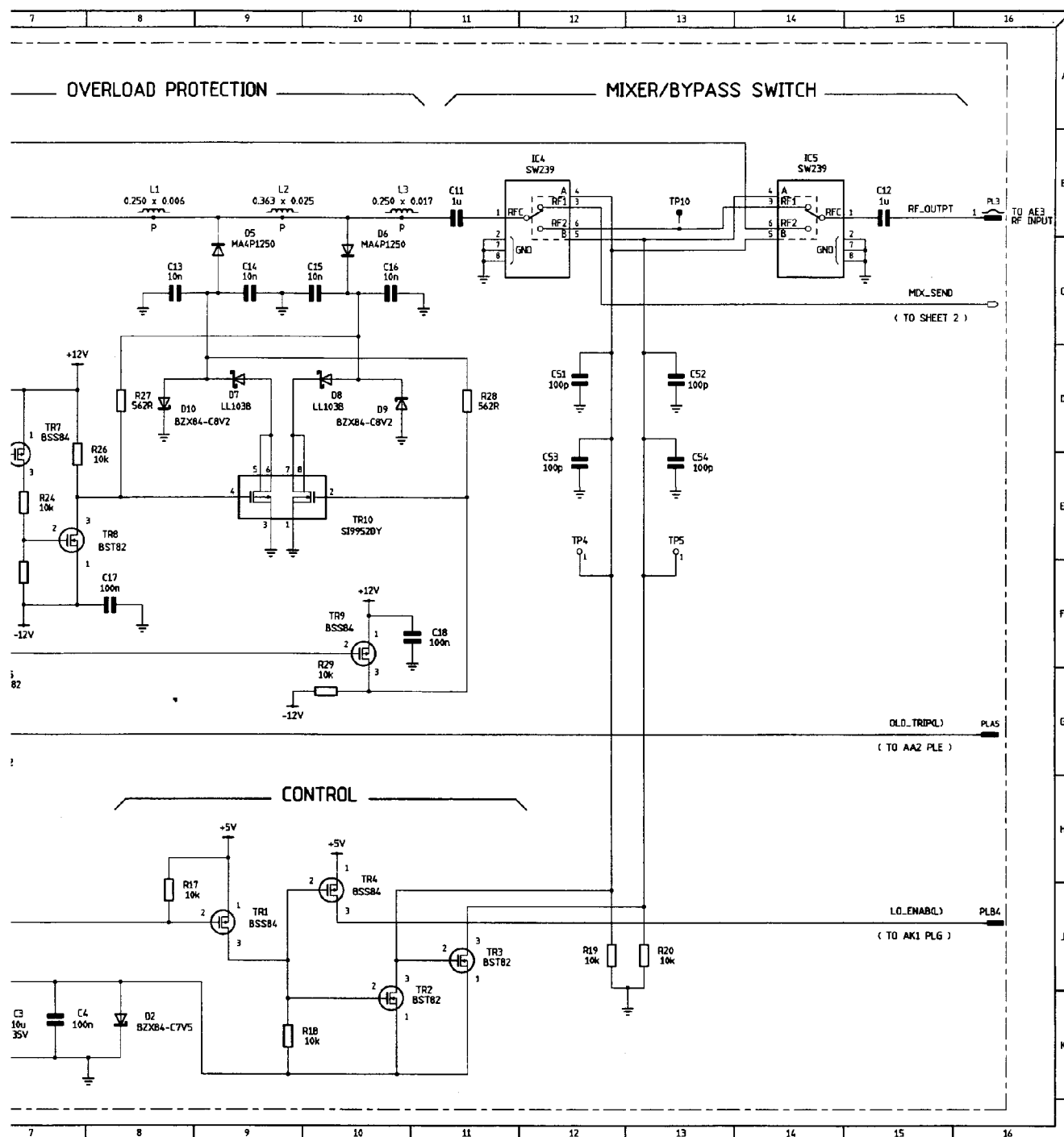
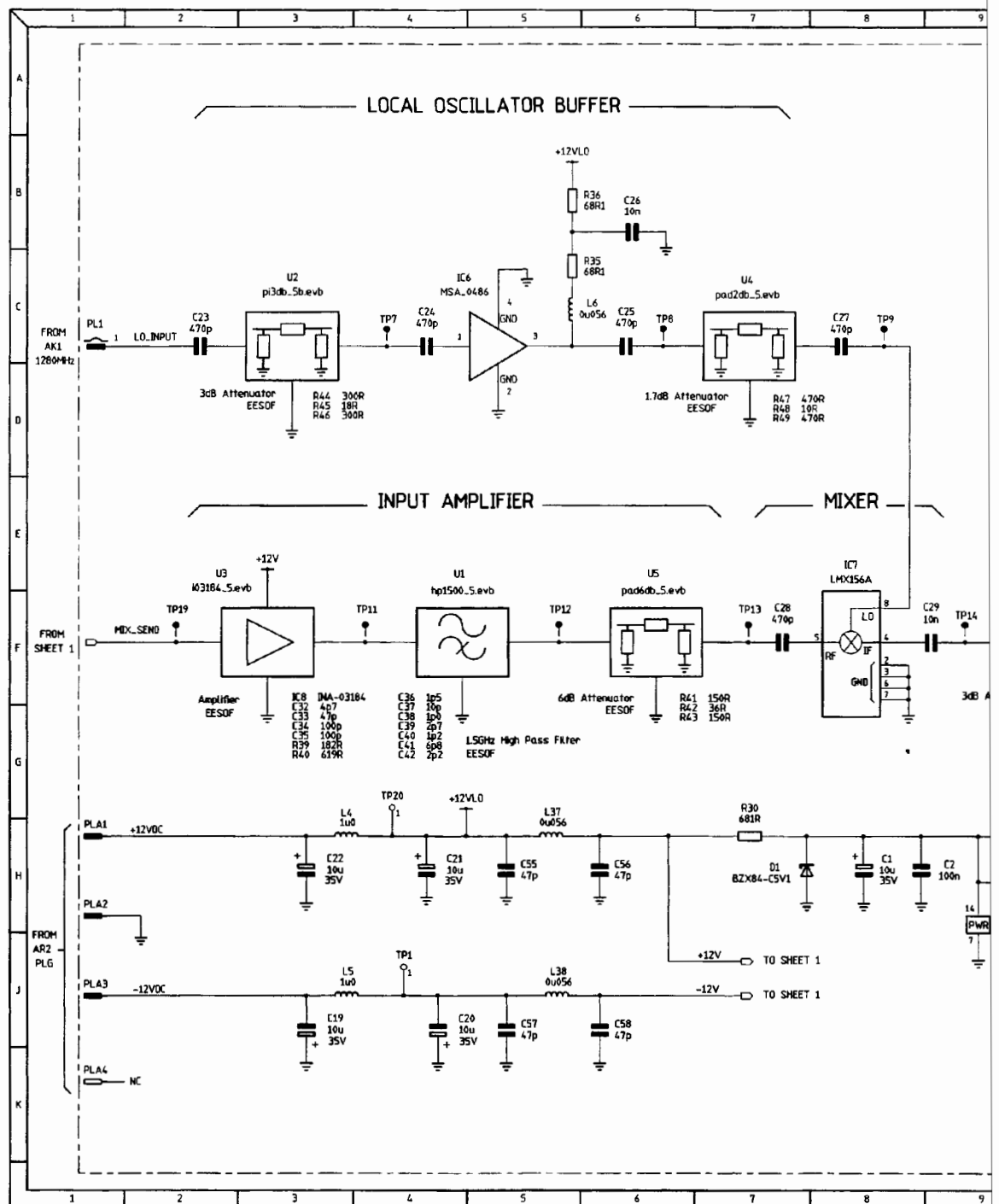
Circuit diagrams **AK2**

Fig. 7-201 AK2 Down convertor - circuit



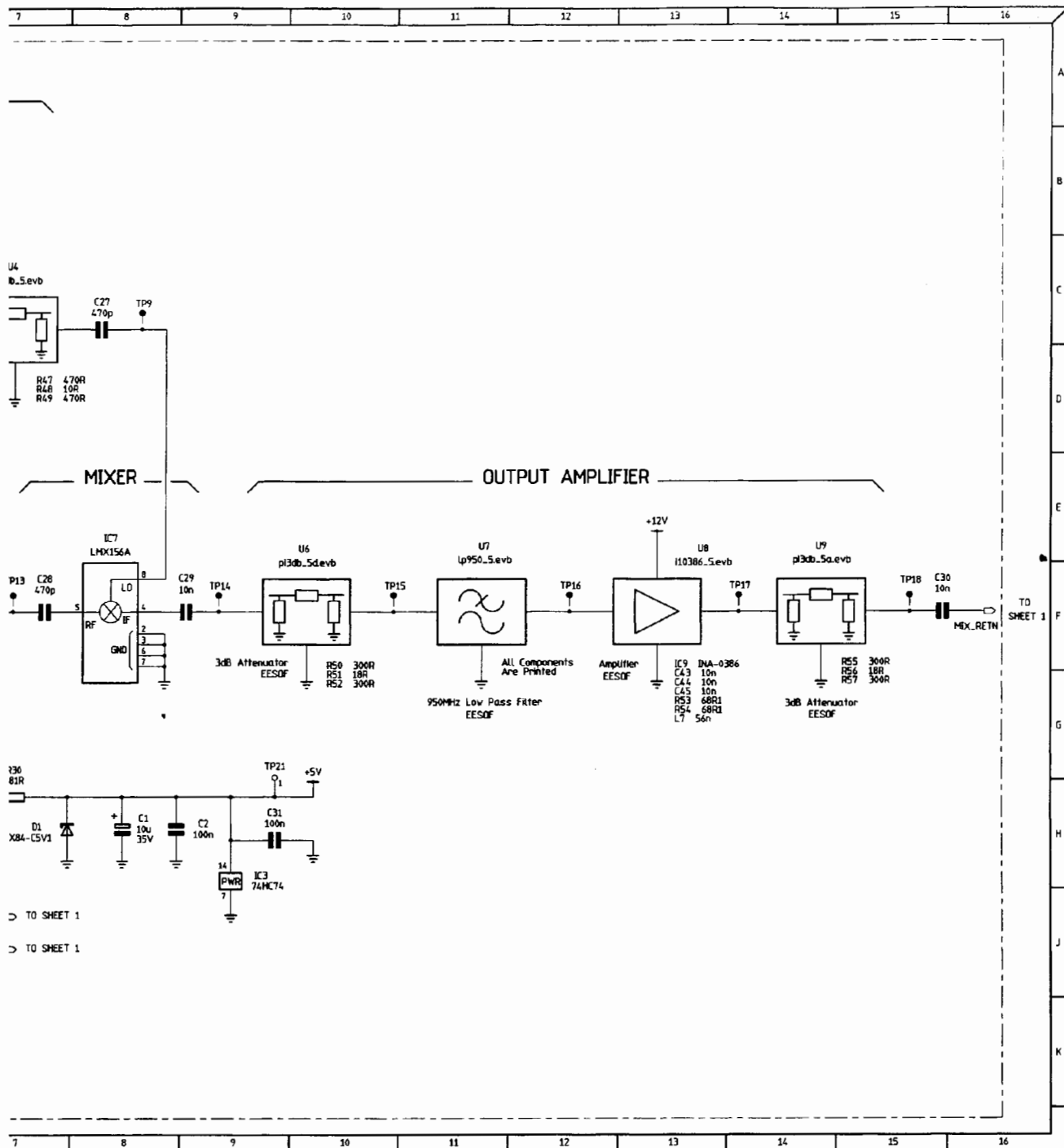
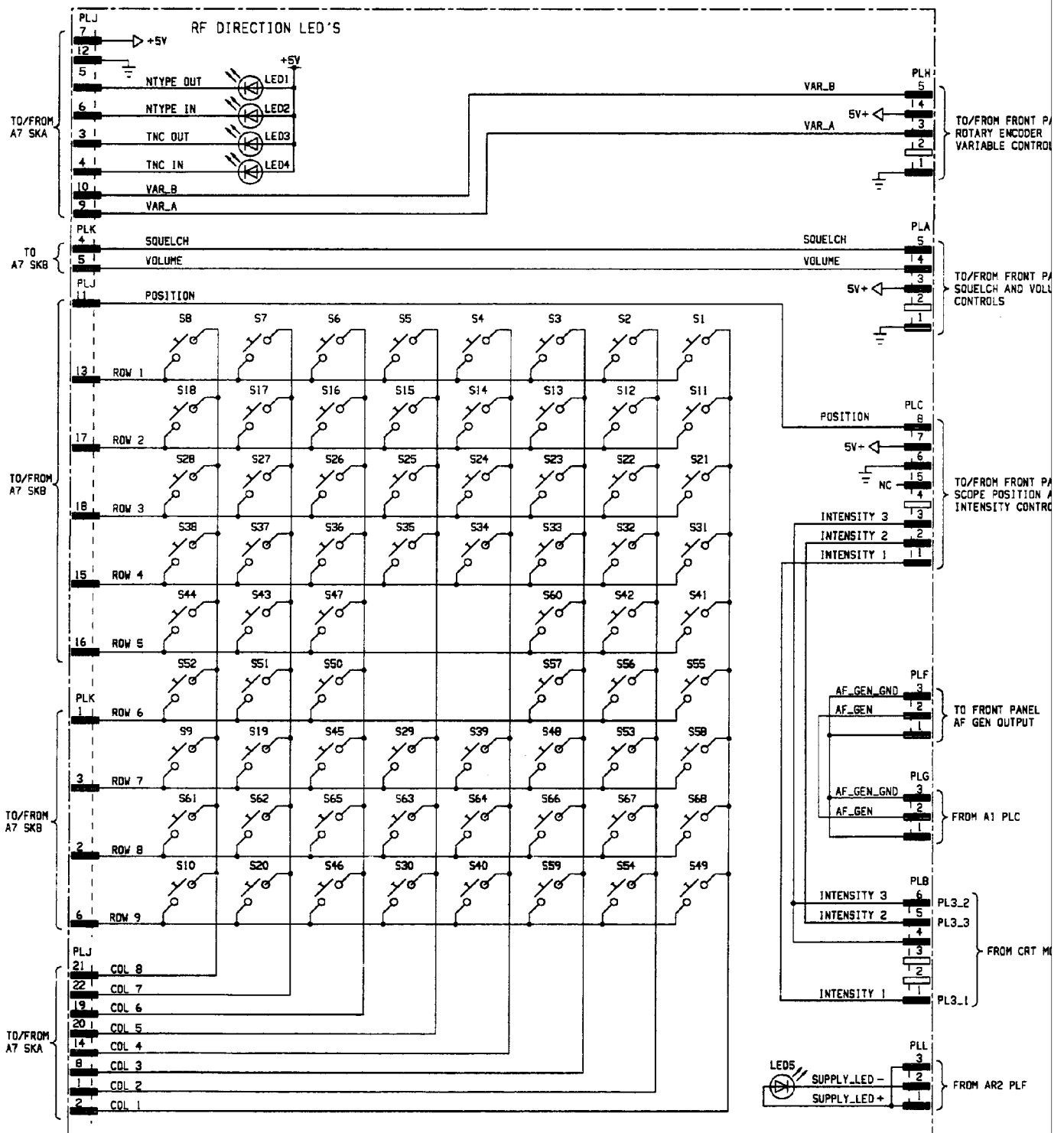
Circuit diagrams **AK2**

Fig. 7-202 AK2 Down convertor - circuit



## Circuit diagram - Keyboard

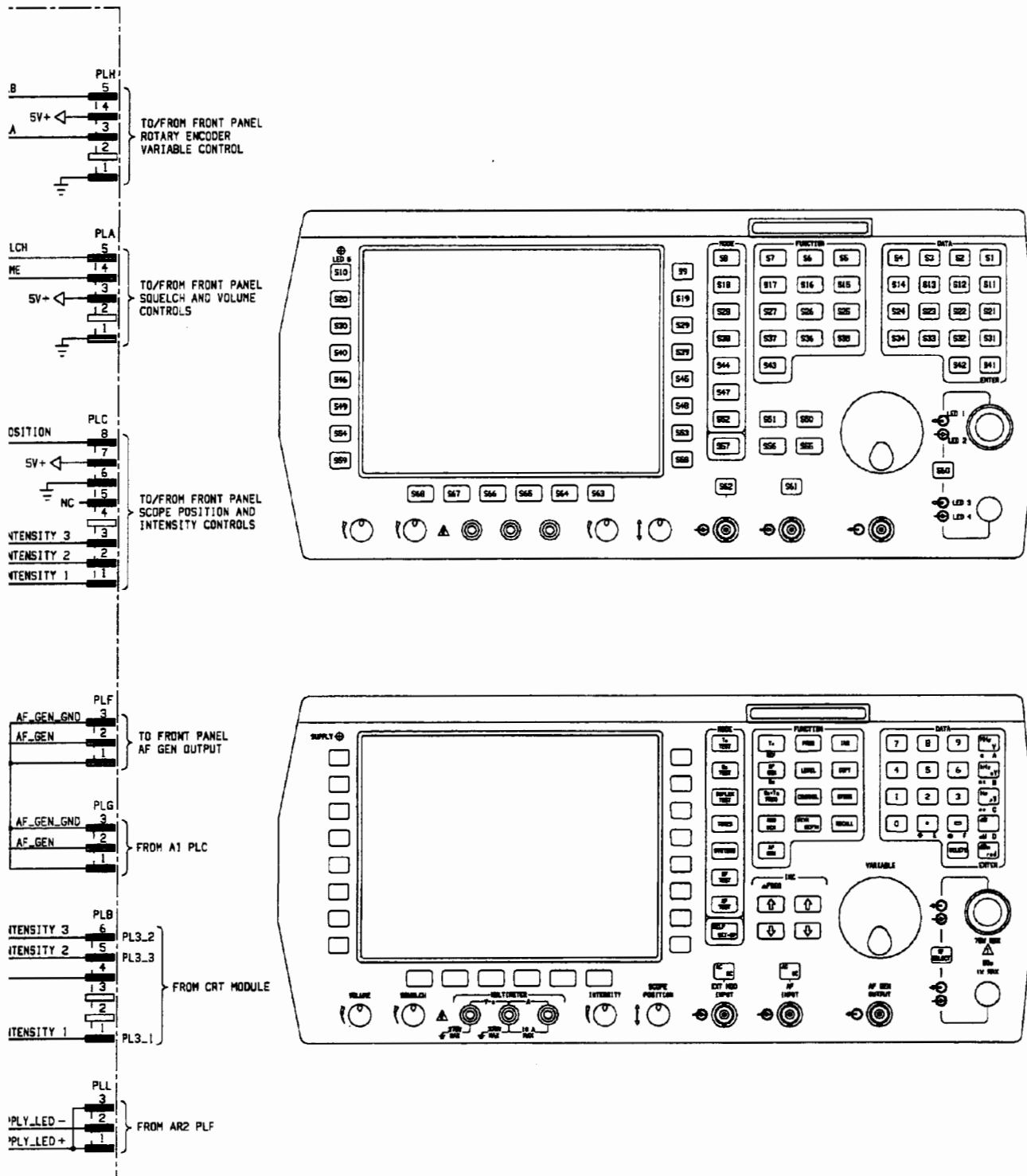


Fig. 7-203 Keyboard - circuit